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A 16-Year-Old Tells His Story

COMPUTER CAMPS

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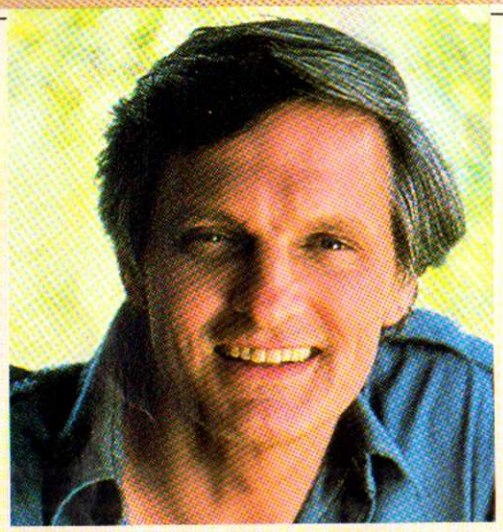

Computer enthusiast Alan Alda uses the ATARI 800XL Computer System. Alda reports: "It's going all the time!"

Introducing the Atari® XL Home Computers: We made them smart enough to know you're only human.

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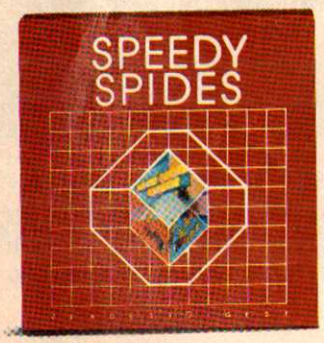

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ENTER™ MENU

MARCH 1984 VOLUME 1, NUMBER 5

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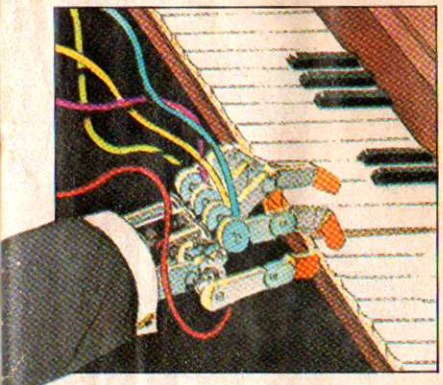

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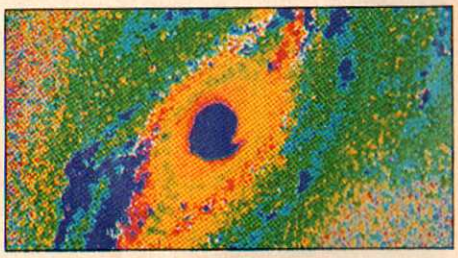

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INSIDE STORY

THE MEANING OF MILWAUKEE

"I really didn't think I was going to get in trouble." —Paul.

Paul, 16, did get into trouble—a lot of it—last summer. He was the youngest of the seven boys from Milwaukee ("the 414s") who spent early 1983 using a personal computer and modem to break into mainframes around the U.S.A. As a result, the F.B.I. investigated Paul and his friends, and is still considering pressing charges against them.

For a few weeks, stories about the 414s were constantly in the news. At ENTER, we watched the coverage with fascination and concern. What was the real story? Were teenage hackers truly dangerous to national security, or was this mostly *WarGames*-inspired hype? We decided that ENTER had to investigate.

We turned to a writer whose coverage of the story—as it was happening—struck us as fair: *New York Times* reporter Joseph B. Treaster. Treaster was not a computer expert. But he had spoken with a number of the 414s, and his articles had presented their case sensitively. He had won a number of journalistic awards. We were very pleased to have him work with us.

Treaster was pleased, too. He saw writing for ENTER as an opportunity to point out the seriousness and significance of the 414s' actions. So, late last fall, Treaster got back in touch with Paul (who asked that we not reveal his last name), then turned in the story you'll find on page 18. We think it tells Paul's story without hype or apology.

Our coverage of the break-ins leads us to these conclusions. Whether or not they actually broke any laws, what the 414s did was an invasion of privacy, and clearly wrong. However, the resulting uproar also made the public aware of the dangers of careless computer security. If a bunch of teenagers can break into mainframes just for the challenge of it, what would happen if someone seriously wanted to threaten national security? We're certain that tighter computer security is a valuable by-product of the 414s' actions.

We're also fairly certain that the 414s have learned their lesson. As Paul told Joe Treaster: "I know now it's not okay to go looking into other people's computers. It's unethical...and you can get caught and get into a lot of trouble."

What do you think? We'd love to know your opinion of the 414s' acts. Fill in our input poll, or write us at ENTER, 1 Lincoln Pl, NY, NY 10023.

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feedback

PREMIERE PUZZLE

The cover of my premiere issue of ENTER has a man with a computer face. But you are advertising a different premiere issue. Enclosed is a picture of it.

This is not the premiere issue you sent me. Please correct this error.

—Susan Seyboldt
Warrington, PA

Dear Susan:

You're right. Our advertising has been showing a different premiere issue than the one you received. ("Computers: Movie Makers of the Future" is the cover story.) The fact is, that issue never went on sale. It was used here at Children's Television Workshop to help raise interest in starting ENTER. And it worked! —Ed.

NEWCOMER

I just bought my first issue of ENTER last night. I like your magazine above most others because it includes a little bit of everything about a computer, (although) I didn't really enjoy the article on Computer Rock (Dec./Jan. '84). That didn't interest me. I plan on buying ENTER from now on. I am also going to mention it to my friends.

—Joshua Johnson
Verona, VA

LEPPARD ELECTRONICS

In your article "Electronic LP's" (Dec./Jan. '84), you only recognized two of Def Leppard's songs that use the Fairlight CMI synthesizer. There are four more: at the beginning of "Too Late For Love," all through "Foolin'," all through "Rock of Ages," and throughout "Billy's Got a Gun."

Also, you kind of mislead when you said "Def Leppard hid a Fairlight CMI synthesizer among the screaming guitars on their hit album *Pyromania*." It made me think that one of Def Leppard's musicians played the keyboards. That is not true. The Fairlight is programmed by John Kongos and Booker T. Boffin.

—Brent Winters
Suffolk, VA

ENTER IS ON LINE!

Now you can write to ENTER electronically on The Source telecomputing network. Although we may not have time for a CHAT, we would really like to SCAN letters from our readers when we do our daily MAILCK. Just POST them to us at our account number: BBI113. And look for our notices on the BULLETIN-BOARD.

FEATURE FAVORITE

I love your magazine. I have every single one of your issues. Your monthly sections like "State of the Art," "User Views," and "Bits" are fun to read and keep me from dying of boredom in the lunch line!

I liked the feature about the "Computer Commuter" because I live in a similar situation. My dad works at home on the computer, but he does not have to tie up any phone lines with a modem. (In fact, we don't even have a modem yet.)

I also enjoy your features like "Computer Rock's First Star" in the Dec./Jan. '84 issue. I knew that computers were used in the making of LP's, but I did not know

that they could do so much with a computer (like when they made a cricket's chirp sound like cymbals!)

—Elizabeth Wall
San Francisco, CA

(Continued on next page)

feedback

(Continued from page 5)

PROGRAM POWER

Your magazines are better than the other computer magazines I get. Some of the other magazines don't have things on home computers. They don't have programs to type in like ENTER. I would like to see more programs to type in at school.

My computer teacher, Mike Ingram at Robbinsville High School, says your programs are a good way to learn about computer language, so I type in every one in your magazine. I typed in the last one and it worked out perfectly.

—Douglas Hooper
Robbinsville, NC

PHOTO © BBC/RETNA

SOFT CELL SLIP-UP

I enjoyed very much your article on "Computer Rock & Roll" (Dec./Jan. '84). I would like to bring your attention to page 29, where you mislabeled the group Soft Cell as the Human League.

I am looking forward to your upcoming issues. Good job!

—Jeffrey Stevens
Vineland, NJ

Dear Jeffrey:

Thanks for bringing the error to our attention. Another reader, William Robertson of Londerry, NH, even told us who's who in the photo. Soft Cell's Mark Almond is on the left and Dave Ball is on the right. The woman in the center is Cindy Ecstasy. —Ed.

GAME FAN

I really like your magazine. I like to read "User Views." And I also like it when you show what the games look like on different computers like [in the ads] on pages 15, 17 and 19 in the Dec./Jan. '84 issue. Looking forward to the next issue.

—Kirsten Palmer
Cottage Grove, OR

CLASS ACT

I like your magazine a lot! My friends always borrow it, and my science teacher used it in my science class.

I find this magazine very useful. We (my family) don't have a computer, but we plan to get one soon.

—Andrea Westergard
Minneapolis, MN

COMPU-CROSS CONFUSION

You made a mistake in the Dec./Jan. '84 issue. In "Compu-Cross" (p. 91) you asked what Mr. and Ms. Pac-Man do in Act II (clue 42 down). You left three spaces to fill in. I could not figure that one out, so I looked at the answer and it said "wed." Act II is called "The Chase." The only thing they do in Act II is run. I've been playing *Ms. Pac-Man* for almost two years now and have never seen them do anything but run. I'm sure other *Ms. Pac-Man* players caught it and you will get more letters from them.

—Kathy Shaffer
Cumberland, MD

Dear Kathy:

You're right—we goofed. There is a wedding between Mr. and Ms. P.—but it takes place in Act III, not Act II. Only those Pac-players skilled enough to clear six screens get invited to this wedding. Thanks for pointing out our error —Ed.

BACK ISSUES

I have a subscription to your magazine and the first issue I received was Dec./Jan. 1984. I really enjoyed it! I was wondering if I could *buy* the issues that I haven't seen. *If* you have any left over, please tell me how many I've missed and how much they would cost.

—Marilyn Gradwell
Columbus, GA

Dear Marilyn:

We're delighted to report that you've only missed two issues of ENTER—October and November, 1983. Back issues cost $2 each. To order, please send your name, address and a check or money order payable to ENTER Magazine to: BACK ISSUES, ENTER, CTW, 1 Lincoln Plaza, New York, NY 10023. Be sure to mention the issues you want. —Ed.

feedback

CORRECTION

In your Dec./Jan. '84 issue it said that Synsonic Drums (by Mattel) were only $50. At our music store they said they were $120.

My dad would like to get these drums for my brother. Who is right and who is wrong?

—Jacob Brady
Lakewood, OH

Dear Jacob:

Unfortunately, we misquoted the price of the Mattel Drums. They actually sell for anywhere from $100 to $120. We apologize for the error. —Ed.

WRITE US!

We'd like to hear from you. Send your letters to: ***FEEDBACK***
ENTER Magazine/CTW
1 Lincoln Plaza
New York, NY 10023

SPECIAL PROJECT

As an independent volunteer, I teach and work with (orthopedically) handicapped children and teenagers. Many of these kids would like to operate a computer or play a video game, but, because of their limitations, cannot. I am working on a project to make it possible for at least a few of them to enjoy the fruits of today's electronic technology.

I would like to know of others who are working on similar projects. —Ralph L. Folsom
780 N. Fair Oaks Ave. #26
Sunnyvale, CA 94086

'USER VIEWS' A SNOOZE

I subscribed to ENTER because I like computers a lot. One thing I don't like about your magazine though, is that your "User Views" are too long. Maybe you could shorten them. —Lisa Lazore
Dubois, PA

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Q&A

BY DAVID B. POWELL

DEAR ENTER: In the movie *War Games*, David Lightman had a peripheral that made his computer "talk." What was the peripheral, and how does it work?

—Eric Hitchcock
Auburn, AL

DEAR ERIC: The type of peripheral you describe is called a "voice synthesizer." Such devices break down (digitize) sounds and speech into a series of numbers.

With the voice stored as numbers in a computer, people can alter it—and even create sounds that never existed before. The Votrax Company (500 Stephenson Highway, Troy, MI 48084) offers a system that can do just that. It's called the Votrax Personal Speech System, and costs about $400. The Votrax can output speech, music and sound effects through computer-driven speakers.

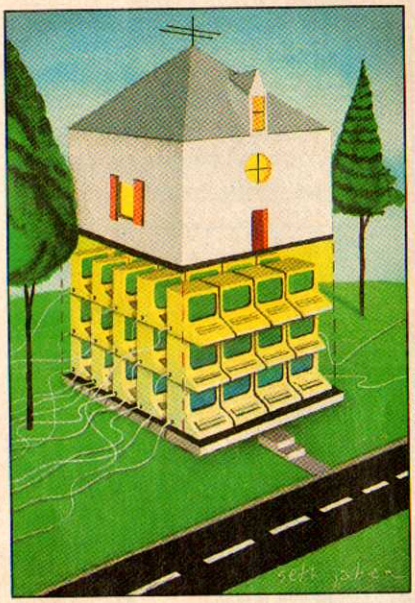
Synthesizing sounds by computer is not hard—even a toy like the TI "Speak & Spell" can do it. The real challenge today is getting computers to *recognize* words, such as spoken commands.

DEAR ENTER: Do some computers come with modems built in?

—Creighton Ikeda
Kaneohe, HA

DEAR CREIGHTON: Yes, some computers do come with built-in modems. (A modem is a device that allows your computer to communicate over telephone lines.)

For example, the Radio Shack TRS-80 Model 100 Portable Computer—no bigger than a three-ring notebook—includes both a modem and the communications software needed to use it. The same is true for a Model 100 lookalike, the NEC PC-8201A. If you own one of these machines, you don't need to buy a separate modem. You can plug into phone lines and compute away!



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DEAR ENTER: How many Kilobytes (K) does a Cray Research supercomputer have?

—David Heikkinen
Prentice, WI

DEAR DAVID: The folks at Cray tell us that the main memory in their giant supercomputer runs to 32 megabytes, which is equal to 32,000 K. To duplicate this capacity with 128K IBM Personal Computers, you'd have to cram 256 of them into your house!

It's the incredible speed of the Cray, as well as its huge memory, that sets it apart from other computers. The Cray 1, for example, can perform a million more calculations per second than the first computer, ENIAC. And, it's a thousand times smaller than ENIAC was.

To connect all of the Cray's memory and circuits, each computer contains 63 *miles* of wire. And, where 256 IBM PC's may only cost you $1 million dollars, *one* Cray will set you back from $4 million to $12 million dollars. And, believe it or not, Seymour Cray designs many of the machines' circuits in his head, without pencil or paper!

DEAR ENTER: Can a person with a Franklin Ace 100 use a light pen with the computer?

—Andrea Paist
Denver, CO

DEAR ANDREA: Yes. According to the people at Franklin Computer, one of the most popular light pens for the Model 1000 is from Gibson Labs (406 Orange Blossom Drive, Irvine, CA 92714). Another is available from the 3-G Company. Both products come with all hardware and software needed to use the pens. Franklin suggests that you contact your computer dealer, and find out which brand your dealer has been using and recommends. (If you'd like to know more about light pens, check the Q&A column in ENTER's October 1983 issue.)

David Powell is a contributing editor to ENTER.

If you have a question about computers or video games we'd like to help. Just send your questions to: Q&A, ENTER Magazine, CTW, 1 Lincoln Pl., NY, NY, 10023.

THE DISAPPEARING T. I. COMPUTER

Texas Instruments announced last fall that they were stopping production of their 99/4 and 99/4A machines and leaving the home computer market.

Here at ENTER, we were flooded by mail from worried TI owners, all asking the same questions: Will TI software and peripherals be available? What about repairs? Is the TI warranty still good? At the same time, with 99/4A's selling for as little as $50, tens of thousands of these machines were sold in the weeks *after* the announcement was made.

Now that things have settled down a little, we can see that the situation is not as bad as many TI owners feared. After all, with over two million 99/4's out there, plenty of companies are interested in producing software and other services for that market. Here's an update on the situation.

SOFTWARE AND PERIPHERALS: All software that TI has in stock will be sold—but the supply will probably run out around the time that you are reading this. However, even after TI stops manufacturing software for its home computers, other companies will continue to do so.

A big problem will be finding stores that still carry TI equipment. Charles Lafara, President of the International TI User's Group thinks that mail order houses will be a good source of cartridges and peripherals for TI owners for at least the next two years. These include: Cor Comp, Laguna Hills, CA: *memory boards and RS232 cards;* Percom Data Corp., Dallas, TX: *disk drives;* Doryt Systems, Glen Cove, N.Y.: *expansion box cards;* Newport Controls, Bishop, CA: *joysticks.*

The Users' Group, with over 85,000 members, is also a source of software and support for TI owners. Among the services they offer is a TI software library. Their address is International 99/4A Users' Group, P.O. Box 67, Bethany OK 73008. Their phone number is (405)948-1023.

Magazines for TI users—like the 99'er Home Computer Magazine—are another good source of news about software and peripherals. The 99'er's address is P.O. Box 5537, Eugene, OR 97405.

SERVICE: TI promises to honor their warranties and to service their machines indefinitely. As John Campbell, public relations manager of TI's consumer products group, put it, "You know, TI will still repair calculators that we haven't sold for 10 years."

TI warranties generally cover repairs on the computer itself for one year after purchase, and for 90 days on TI peripherals and software. After your warranty expires, TI will continue to service your system through its 47 repair centers across the country. These centers used to trade your ailing machines for a new one, but there won't *be* any more new 99/4A's. So TI will now replace your sick machine with one that someone else has returned and that TI has fixed. If you want to keep your own machine, then TI's John Campbell suggests mailing it by *insured* mail to TI's Service Center, P.O. Box 2500, Lubbock, TX 79408.

If you have questions about service or warranties, you can still call TI on their toll-free line 1-800-TI-CARES.

—David Powell

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DAUGHTER KNOWS BEST

BY ELIZABETH DISNEY

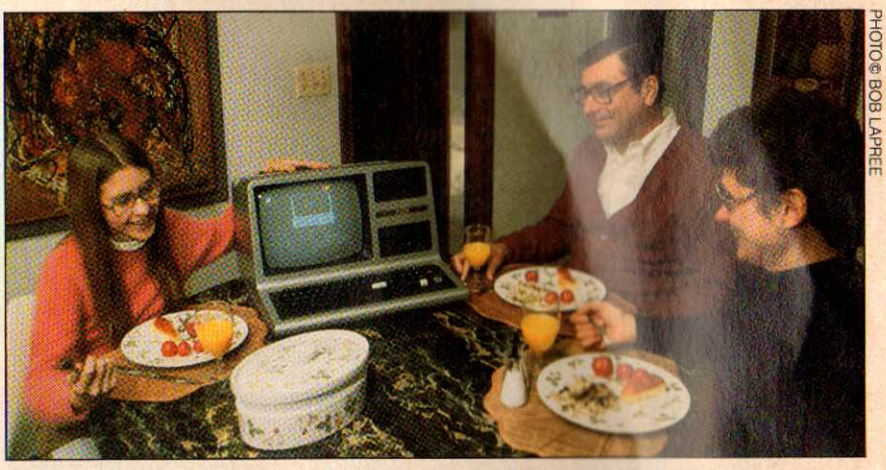
Do your parents use the family computer? If they don't, you should try to get them interested.

"My parents?" you say. "Why let them get into the act? It's only going to take up time on the computer when I might want to use it." Well, that's a good point—but don't be selfish. Isn't it time your parents stopped being computer illiterates?

Besides, there are benefits to you if your parents get involved with the family computer. They'll probably buy more software if they are interested in using the computer—and that's software you can use, too. And surely your parents will be fair about sharing computer time. All you have to say is "I want to do my homework"—and they'll scramble to get out of your way.

It's best to start off teaching one parent. If you try to teach both at the same time, it might cause more problems—one is almost always a faster learner than the other.

Next, hang around him or her, and be encouraging about the project. You might say things like, "But aren't you *ever* going to use the computer? How soon? Why not now? What about tomorrow? But didn't you buy it for *yourself*, too? Oh, come on!"



PHOTO© BOB LAPREE

Parents can be taught to use computers—but it takes time.

Be careful, though, to avoid whining. Just be persistent—and always nice!

If you're not making any headway, collect the names of other adults you know who use home computers—a list of five should be impressive enough—and then, when things get sticky, present your evidence: "You know Becky Jones' parents know how to use computers," you could say, then run down the rest of your list.

In the beginning, make sure that you don't give your parents anything too difficult to do. Otherwise, they will start to feel they can't handle the computer. That could scare them away forever! This is a big problem with most adults—they're just a little frightened by computers.

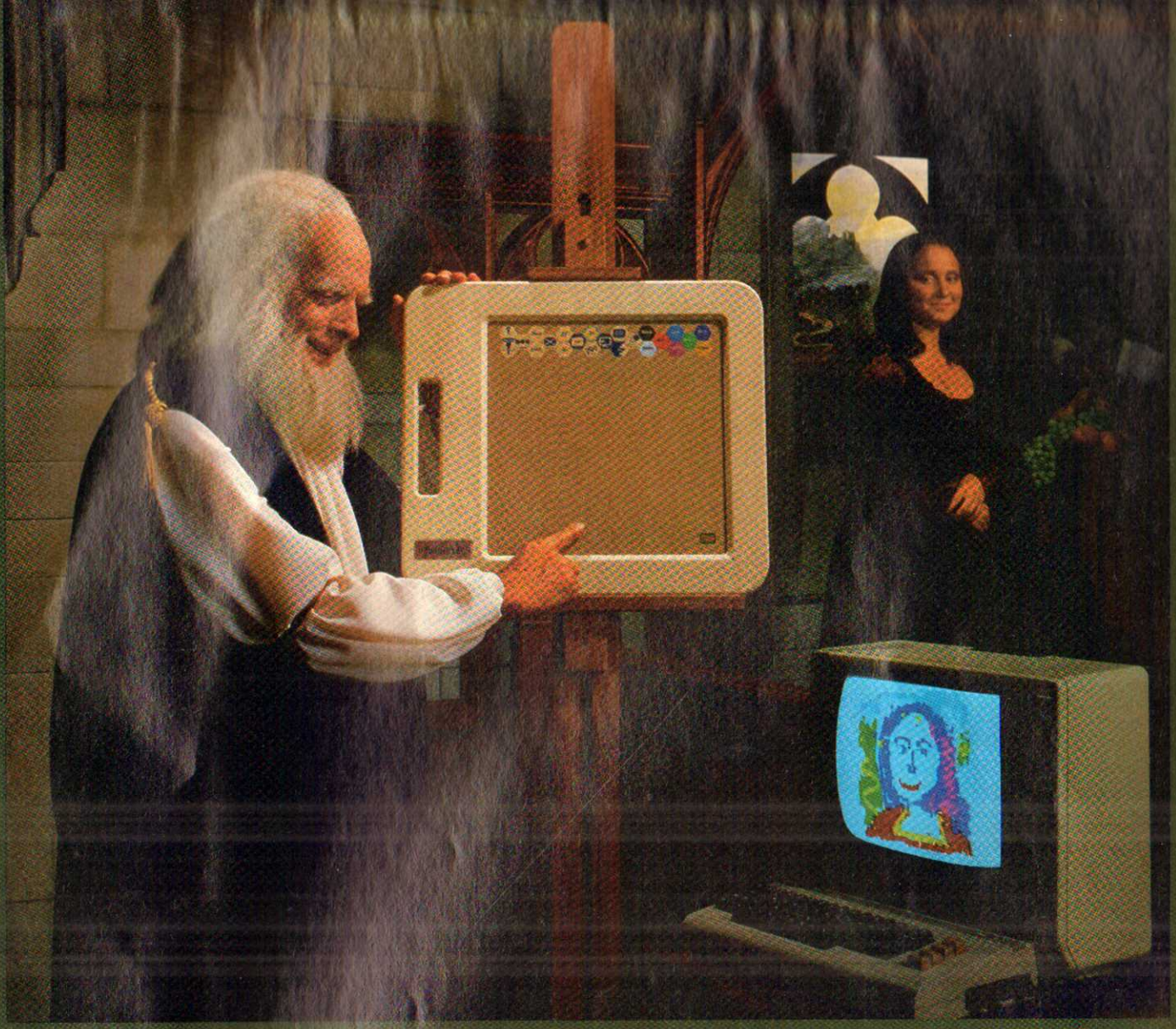
The best thing to start your parents off with is a video game. Games are more fun than plain programming and usually easier, too. After a while, your parents will get used to the computer and you can pick a more challenging program for them to work on. Probably the surest way to hold their attention is by picking programs that appeal to their individual interests. For example, my mom, who has always wanted to be a writer, really hit it off with a word processing program.

Programs with practical value also appeal to parents—maybe one for cataloguing household items, or a recipe file to replace all those stained, blotchy index cards. These might be boring to you, but parents like them.

Things will change once you've gotten your parents interested. You'll probably lose the "kid genius" edge—when you discuss a program with a friend, your parents won't see you as "super-intelligent" any more. But at least you'll have a lot to talk about at the dinner table!

And besides, would you want to be responsible for YOUR parents being computer illiterates?

ELIZABETH DISNEY is 13 years old and lives in Hollis, New Hampshire.



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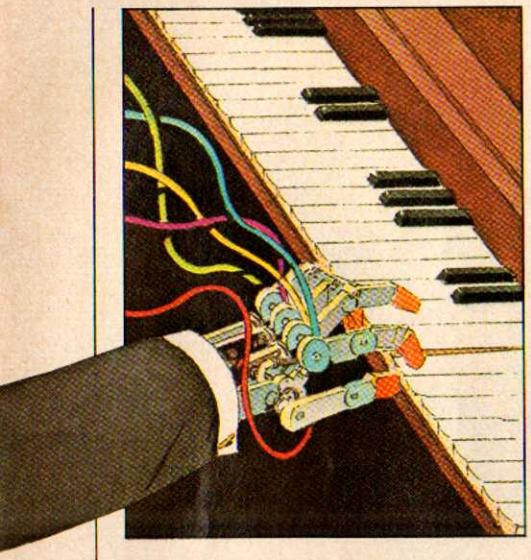


HEAVY METAL MUSICIAN

It's the year 2015. You're attending a recital of one of the finest pianists of the times. The lights dim, the curtain rises, and there on stage, decked in a tux, is a robot. It launches into an amazing concerto.

Sound far-fetched? Not if you've heard about WAM-7, a new robot hand that's been developed by Professor Ichiro Kato of Waseda University in Tokyo. Like a human hand, WAM-7 can cross one finger over another, giving it the dexterity required for playing the piano. And the WAM-7 can strike as many as 10 piano keys a second—faster than any human can.

WAM-7 made its debut last fall. This spring, Professor Kato hopes to unveil a complete piano-playing robot, with head and body. What's next?

A robotic rock band?

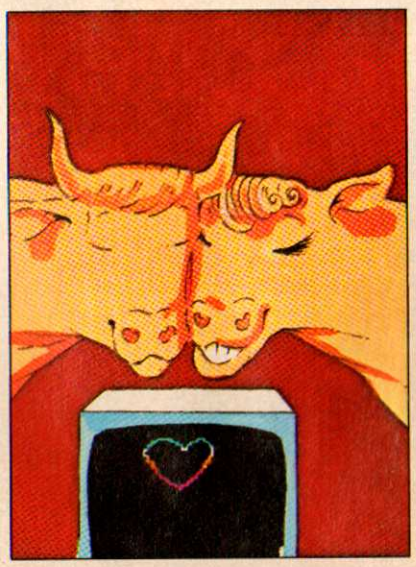
■ ■ ■

ZOO LOVE

Getting a date isn't easy when you're a seven-foot-tall gaur ox. You can't just hang around the local hamburger joint waiting for some cheerleader oxen to wander by. You need help.

Zoo officials understand this. They've set up a computerized mating service to make sure their rare and endangered species don't have too many lonely Saturday nights. The service, called the International Species Inventory System (ISIS), is located at the Minnesota Zoo, near Minneapolis. There, the ISIS computer lists the number of male and female animals at member zoos and gives information about species, age and "availability."

By tapping into this dating data base, zoos can easily play matchmaker. Before computers, says Los Angeles Zoo director Warren Thomas, "You would spend your entire life on the phone trying to figure out who had what."



This computer service seems to be a success. That seven-foot-tall gaur ox is now booked solid through April!

■ ■ ■

64 PICK-UP

Eight-year-old Salil Pitroda may not be a card shark, but get him playing gin rummy *his* way and he's likely to ace you. Salil's way is using "Compucards," a deck of 64 binary playing cards that may one day replace the 600-year-old traditional decimal deck of 52.

Salil is a computer hobbyist who prefers his TRS-80 to card-playing. His father, Sam, is an avid bridge player. The Downers Grove, IL, father and son got together last winter and created the binary deck. Using the spades, hearts, and other familiar suits in a slightly modified way (there are eight suits in the new deck), "Compucards" are numbered 1, 2, 4, and so on, up to 128.

ILLUSTRATIONS© ANDREA BARUFFI

The Pitroda's deck does away with the ace, king, queen and jack. On the highest value cards are pictures of a computer and a programmer. And what of the Joker? It's a bug, of course.

DOWNLOADING

Last fall, Atari turned software into hardware.

No, it wasn't a high-tech miracle. This transformation of information happened when 14 truckloads of Atari video game cartridges were covered with concrete.

The cartridges were brought from an Atari plant in El Paso, Texas, to a city landfill in Alamogordo, New Mexico. While guards kept curious spectators away, the games were covered with concrete.

Why?

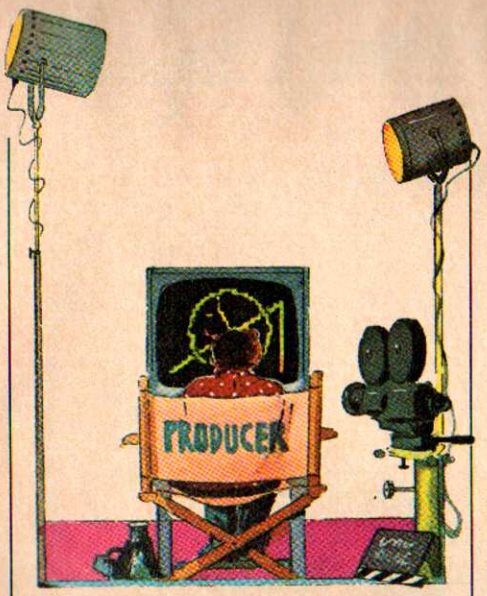
The company claims the cartridges were defective. And we thought they were just trying to make the games harder.

FROCK TALK

Take 3,000 18-karat gold-plated computer chips, sew them together for a year and a half, and what do you get? A computerized kimono, naturally!

Clothing designer Melissa Panages has created a state-of-the-art line of glimmering garb. Melissa calls her fabric invention "20th Century armor" and rightfully so. The kimono weighs a hefty 10 pounds.

That's not the heaviest fashion news, however. The retail prices on the Panages line range from $1,000 to $50,000. Available at Macy's department stores, Melissa's creations are what you might call chips off the old frock.



LIGHTS! ACTION! JOYSTICK!

They live a long way from Hollywood, but 16-year-old Andrew Morgan and his 13-year-old brother Philip obviously dreamed about being big-time movie producers making multi-million dollar mega-epics for the silver screen.

Andrew and Philip, who live in England, haven't gotten their wish, but they have created a new video game called *Movie Producer*. In this game, you have to deal with angry actors, difficult directors and unfriendly critics as you struggle to make a big box office hit.

Movie Producer is the very first game from Andrew and Philip's new company, Silly Software. But don't get set to make that movie right away. So far, the game is only available for the Dragon 32—a British computer.

COMPUTER CAMPUS

Imagine a school that's open 24 hours a day.

That may seem scary, but it's actually one of the benefits of the "world's first electronic university." The "electronic university" enables students to use a home computer and modem to link up with a network of teachers any time, day or night.

The network was developed by TeleLearning Systems Inc. of San Francisco, CA. One hundred and seventy courses—on everything from child care to art—are available at Electronic U. Courses cost between $35 and $100. Students use their personal computers and a modem to communicate with teachers, hand in assignments, and get homework.

Fortunately, TeleLearning has not yet come up with a way to have the computer send you to the principal's office.

BIT PARTS

An ENTER *announcement:* WANTED!! Be on the lookout for "Bits," high-tech news items that sneak into your local paper or evening news show and pique your interest, or make you laugh. KEEP ALERT. There may be something Bit-worthy happening at your local arcade or school computer club. REWARD: If you're the first with information that leads us to a bona fide Bit, we'll send you an ENTER T-shirt. Send a newspaper clipping or brief description of the Bit—including your name, address and phone number—to: "Bits" Editor, ENTER, CTW, 1 Lincoln Pl., NY, NY 10023.

(Continued on next page)

bits

COMPUTER CONTESTS

Video game design is no longer a spectator sport. Two new contests draw on your designer skills. ***The Kraft Kideo Game Contest*** is looking for computer game ideas that "focus on the importance of eating a balanced diet." Turn those fine foods into a 500-word game description, and you stand a chance of winning a four-day visit for four to EPCOT Center/Walt Disney World. Entries must be in by March 31. For details, write: Kraft Kideo Game Contest, P.O. Box 845, South Holland, IL 60473.

Broderbund Software's Arcade Machine Contest is for owners of Atari computers. Between January and June, Broderbund will pick the most original games designed using its *Arcade Machine* game-making software. Monthly winners will be eligible for a $1500 computer equipment grand prize. The *Arcade Machine* software lets you design games, even if you can't program.

For contest details, write: Broderbund Software, 17 Paul Drive, San Rafael, CA 94903.

COMPUTERIZED PIZZA

Pizza is still the ultimate floppy disk. Piled high with cheese and tomato sauce, the pizza is almost always user-friendly.

Now, researchers at the University of Missouri-Columbia are using a computer to create an even more nutritious pizza pie. The computer doesn't actually eat pizza, but it does digest visual information about the pie through a special TV-like camera. Scanning the bottom of the crust, this computer eye measures brownness and gauges the nutritional quality of the pizza.

This system is not designed for use in your home, explains nutritionist Dr. Nan Unkelsbay. "But a commercial version of our system could monitor every pizza crust coming out of big processing ovens, then automatically adjust

baking time and temperature," she says. "Computers may become the cook's best friend."

This might be true. But next time you order a pizza with everything on it, tell them to hold the microchips.

FAST-TALKING VIDEO GAMES

NEWS ITEM: K-TEL, the company that makes all those greatest hits record collections (and all those fast-talking late night TV commercials), has entered the video game business under the new label Xonox.

Imagine what it would sound like if their game commercials were like their record ads:

"...That's right, the greatest hits of all time, here for the first time anywhere. Where were you when you first played this game? 'Blip-Blip-Blip'...That's right, the best of *Pac-Man* and the Power Pellets, *Donkey Kong* and the Barrels, Joystick and the Fire Buttons... And, reunited for the first time, the incredible Mainframes, with their billion selling hits: 'Memories, like the numbers on my bits...' and 'You ain't nothing but a game disk, loading all the time...'

"And that's not all. Act now and we'll throw in an upright Rewitt change machine. Operators are standing by....Call now!!!"

A NOVEL IDEA

Using a small computer and a big imagination, Seattle has become the first city ever to write a novel.

The book, tentatively titled *A Tale of One City*, was the brainstorm of a local group called the Invisible Seattle Literary Computer Project. Dressed in white overalls and hardhats, project members "collected words" from people all over the city. "People described their cars for us, told us what they had in their pockets, and gave us all kinds of information," explains project coordinator Philip Wohlstetter.

All these words and details were then entered into an Eagle personal computer, where a specially designed program helped organize the data and break it into chapters. In September, at the city's annual Bumbershoot Arts Festival, dozens of volunteer "literary workers" sat at terminals and filled in the action that transformed Seattle's words into what project members hope is an exciting detective story.

Now, someone has to figure a way to fit all the authors' names on the cover.

VOCATIONAL VIDEO

You learn more than the best way to zap enemy spaceships when you play video games, according to a recent study by Harvard University graduate student Diana Gagnon.

After testing fellow students on the games *Targ* and *Battlezone*, Gagnon concluded that video game playing can help improve eye/hand coordination and the ability to judge distance.

"Spatial skills [such as these] appear to be particularly important to success in professions such as science, engineering and design," Gagnon's report concludes.

So next time you're being chased through a maze or outer space, remember—this could lead to a very promising career.

IF A COMPUTER ANSWERS, HANG UP

Know anyone who's a little tardy paying his or her taxes? The U.S. tax collector, the Internal Revenue Service, does. And they've got a computer taking care of the problem—by phone.

The $107 million automated I.R.S. collection service keeps records on people who haven't paid their taxes. Their information includes amounts owed, time overdue and phone number. Automatically, the system calls these numbers Monday through Saturday. If there's no answer, or a busy signal, the computer tries again later, redialing until someone *does* answer. Once a connection is made, a human I.R.S. agent gets on the line—and a taxing discussion ensues.

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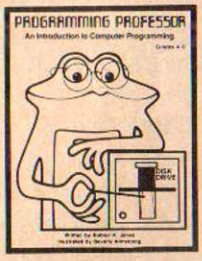

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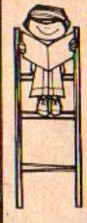

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USER VIEWS

TO BLAST OR NOT TO BLAST?

BY PHIL WISWELL AND BERNIE DEKOVEN

We're stumped. As game reviewers for ENTER, we want to tell you about the best video/computer games we find, and warn you away from the worst. But we've got a problem: We don't like violence in games, and don't want to promote it. However, 90 percent of all electronic games have elements that could be considered violent. You're either shooting aliens, forcing your opponent's car off the road, or "eating" ghosts in a maze. So what should we do when some of the best games we come across—"best" in game play, concept and graphics—feature actions that seem violent?

Frankly, we don't have the answer, and we need your help. This column discusses some of the best action games we've come across recently. We'd like you to read our reviews and think about these questions:

1. Do any of the actions of these games bother you? For example, are you aware that the main goal of *Demon Attack* is killing birds?
2. If these things bother you, tell us if—and how—they take away from your enjoyment of the games.
3. Are there certain types of games you don't want to read about in this column?

We'd like to know your opinion. Write us at USER VIEWS, ENTER, 1 Lincoln Plaza, New York, NY 10023. We'll print some of the letters we get in an upcoming issue.

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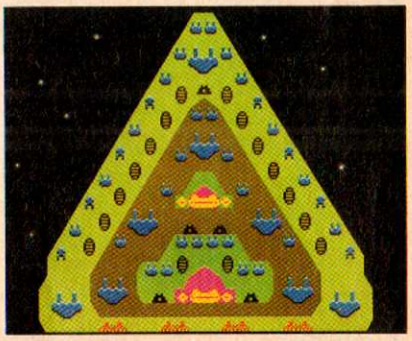
DREADNAUGHT FACTOR

(Activision, Intellivision, $40)



"This is the kill-the-battle star game I dreamed of after seeing 'Star Wars.'"—Bernie
"A 'Zaxxon'-inspired challenge of shooting and dodging."—Phil

Think of a dreadnaught as a huge battleship in outer space, with more targets than you can shake a joystick at. Each dreadnaught is on its way to your planet. You have a limited time to destroy it before its missiles are within range to destroy your homeland. The dreadnaught is so large that your jet must make repeated passes to effect enough damage.

Each of these targets has strategic as well as point value. Bomb an engine and the dreadnaught's approach is slowed; hit a communications bridge and it fires with decreased accuracy; knock out the missile silos and it cannot destroy your planet.

Graphics and sounds are good, and the scrolling action is very smooth. What's more, this is one of the few Intellivision games where the controller works pretty well.

WRAP-UP

BERNIE: The dreadnaught is a robotic kind of enemy.
PHIL: This is the target gunner's dream, and the best game of its kind for Intellivision.

◆◆◆

KABOOM!

(Activision, Atari 400/800/1200 XL, $34.95)

"A nice, simple, fun game for all ages."—Phil
"And the two-player enhancement makes a good game even better."—Bernie

As in the original VCS version, *Kaboom!* pits you against a mad bomber who races across the top of the screen and drops a stream of sizzling bombs. The object of *Kaboom!* is to catch the bombs.

This computer version doesn't improve on already good graphics, but it does contain a musical extra. Each bomb you catch plays a note from the melody to the *1812 Overture*. Nice touch!

The big improvement is that *Kaboom!* can now be a two-player

(Continued on page 58)

Wanted: tycoon to build American railway empire. No experience necessary.

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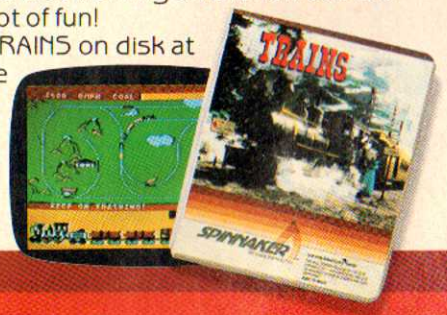
Because TRAINS™ computer game puts you in charge of an old-time railroad—and whether your empire gets bigger or goes bankrupt is entirely up to you.

As you speed around the tracks, you'll see that a lot of industries depend on you. The folks at the sawmill need you to bring in logs from the lumber camp. While without your delivery of ore, the factory will close. Pick up and deliver at the right place and time and you'll make money—which you'll need to pay your workers and keep the locomotive filled with coal.

If you play it smart, you'll make enough to expand the railroad into new territories. If you don't? Well, you'll understand how a business can go bankrupt! Either way, you're going to find that working on this railroad is a challenge—and a lot of fun!

You can catch TRAINS on disk at your local software retailer, and play it on your **Apple,®** **Atari,®** **IBM®** or **Commodore 64™** computer.



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Computer Break-ins

CAUGHT IN THE ACT

THE YOUNGEST MILWAUKEE 414 TELLS HIS STORY

BY JOSEPH B. TREASTER

Paul had just come home to Milwaukee from a vacation trip to Yellowstone National Park with his mom and dad and his older brother Steve. He promptly telephoned a computer friend to see what had been going on while he was away.

"We really did it this time," Paul's friend said. "The F.B.I. was here today."

Paul gulped, but didn't say anything to his parents. A week later, an F.B.I. agent in a three-piece suit—with a .38 revolver showing under his jacket—was at Paul's door.

The visit from the F.B.I. was unexpected, but Paul knew why it had happened. During the first months of 1983, Paul, 16, and half a dozen other boys from Milwaukee had been using their home computers and modems (telephone hook-ups) to electronically break into main frame computers across the country. Most of the boys, who range in age from 16 to 25, met as members of a local Explorer Scout troop, where a common interest in computers drew them together. They started calling themselves "the 414s" after the Milwaukee area code.

By the time the F.B.I. succeeded in tracing them in August, 1983, through calls the 414s had placed to big computers at the Sloan-Kettering Cancer Center in New York and the nuclear weapons facility at Los Alamos, NM, these Milwaukee hackers reportedly had explored more than 60 computers.

The news about these break-ins sped across the nation like a summer storm. The 414s were the focus of national attention. One of them, 17-year-old Neil Patrick, became a type of instant celebrity, featured on magazine covers and TV news programs. Patrick's lawyer made special arrangements to cooperate with Federal authorities, and Neil was granted immunity from any criminal charges. Paul—the youngest and perhaps most computer-savvy of the 414s—and

PHOTO© HOWARD BERMAN STYLED BY ELLEN CHRISTANSEN

his other friends may still have to go to court and face legal punishment.

Some people saw the activities of the 414s as simply "teenage antics" or *WarGames*-inspired pranks. Paul and his friends said they didn't *mean* any harm in poking around in other people's computers. They just wanted to see how the big machines worked.

But a number of computer security experts saw the whole event as more serious. The mainframes could easily have been damaged by inexperienced users. Valuable files could have been deleted inadvertently. Whole systems could have been shut down by the 414s' instructions. Many people worried that supposedly secret information was no longer secret.

In fact, officials at the Sloan-Kettering Cancer Institute in New York pointed out that the 414s did about $1,500 worth of damage by deleting two of the computer's daily files. Those files were ones used to record those who sign on. Paul—who agreed to talk with ENTER only on the condition that his last name not be used—now says that the 414s deliberately deleted the files in an attempt to cover up their entry into the system. He explains that they later realized that the files were used for billing, and that they devised another way of getting into the system without leaving a record.

"But it was too late," Paul recalls now, "there was nothing we could do to bring the files back. We didn't mean to delete anything important. It was a mistake."

PAUL'S STORY

Paul first got involved with computers when he was 11 years old. "My dad thought computers

> **"You don't think the police or F.B.I. will come to your house... It's a big shock."**

were the thing of the future," he says, "and he wanted me and my brother to learn about them." So the boys went shopping with their father and bought a TRS-80 Model I.

Paul's father, who works in a factory assembling robots, and Paul's brother, Steve, 18, learned to use the computer. But from the start, Paul was the one who used it most. Almost immediately, he began to teach himself BASIC. Within six months, Paul had bought a Chatterbox 300 baud modem. At first, he used the modem to connect with electronic bulletin boards. But it wasn't long, he says, before he was using the modem to get into the computers of Milwaukee businesses, his high school, and the Milwaukee School District. A few months after Paul got his modem, he got an Epson MX 80 printer. Later, he converted the TRS-80 from cassette to disk drive and expanded its memory from 16K to 64K. By the time the F.B.I. knocked on Paul's door, he had been looking into other computers for years.

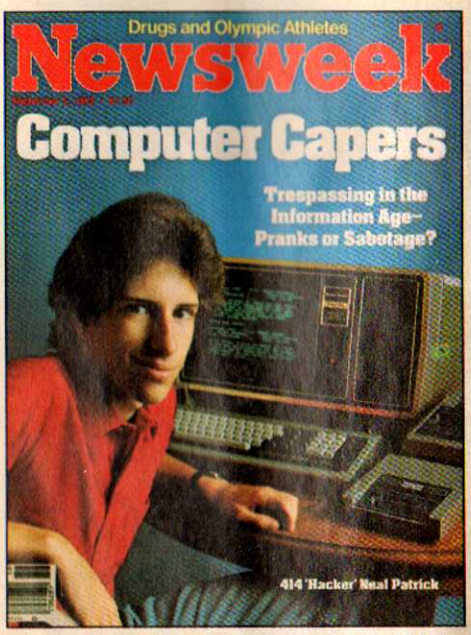
"It was the ultimate game," he says. "It's pretty neat, actually, to get in there and learn exactly how an entire computer system works."

He still thinks breaking into computers is exciting, but after the F.B.I. began investigating him and the other 414s, he says he decided, "It's not worth it. It's not that much fun having the police and the F.B.I. come over to your house and being yelled at by your parents. I'm definitely not going to do it again."

Like the parents of most of the 414s, Paul's mom and dad hired a lawyer to deal with the F.B.I. His parents took his computer away for two weeks and made him do extra chores like vacuuming and dusting the house, taking out the garbage and mowing the lawn more often.

Paul has a B plus average at Washington High School, a special computer science public school in Milwaukee. He plans to go to college and to have a career in a business that involves computers. When he and the 414s were breaking into computers, he never imagined he might be putting his future in jeopardy.

"It never entered my mind," he says. "You don't think the police or F.B.I. are ever going to come to your



For a few weeks last summer, the 414s were the center of national attention.

house. It's a big shock when you see them. You're only in your bedroom calling another computer."

But after he and his friends were caught, he began to worry. "He was very concerned he would not get back into the computer program at school," says Paul's attorney, David Youdovitz. Paul did get back into the program, but, says Youdovitz, "I think that shook him a bit."

Paul should have known better—he'd broken into a computer before and been caught.

A POLICE PARTY

Of all the 414s, Paul should have known better. Just six months before the F.B.I. showed up, Paul had gotten into trouble breaking into the computer at the Milwaukee School of Engineering. He had been entering the PDP 11 computer once or twice a week for four months. It wasn't just harmless looking around, either. When the systems operator at the engineering school discovered Paul had gotten into his computer, he tried to kick Paul off. Paul got mad and retaliated.

"I used up all the storage space available on the computer," he says. "I just filled it up with a giant file I made and then nobody could save programs."

That didn't happen just once, but five different times. And each time, Paul says, it took the school two or three days to clean out its system.

One day Paul came home from school and saw a lot of cars parked in front of his house. "I thought some neighbor was having a party," he said, "but when I opened the door there were four detectives and the guy from the Milwaukee School of Engineering in my living room."

At first, Paul says, he was scared. But then he started getting mixed signals. His parents "didn't really think it was that bad a thing" and he got the impression the police "thought it was pretty great.

"One of the cops asked what I was doing in the police station," Paul remembers, "and I told him I broke into the Milwaukee School of Engineering. He said, 'You went down there and broke in?' And I said 'No, I broke in over the telephone.' He said, 'That's illegal?'"

Other computer friends, Paul says, joked about the incident.

The engineering school, however, didn't think the intrusions were funny. The school agreed not to prosecute Paul, but did take his computer away for 90 days and had his dad pay $500 in restitution.

Paul got his computer back in late May. Two weeks later, he started looking around in the Telenet system for computers he could break into.

"All my friends were doing it during the time that the engineering school had my computer," he said, "and it was too tempting." And, he adds, "I didn't really think I was going to get into trouble again if I didn't screw up anything."

That's what the other 414s have told reporters. Shortly before Paul got his computer back, however, Wisconsin had enacted a law that imposed a penalty of up to nine months in jail for unauthorized entry into someone else's computer. A copy of this law had been put into the computer system at his high school. Paul read it. He says he understood the law protected computers from maliciousness.

But, he says, "Just looking around? That wasn't so clear to me. I know now it's not okay to go looking at other peoples' computers. It's not your property. It's unethical and you can get caught and get in trouble."

"Paul, in my opinion, has displayed a lot of maturity after what happened," says attorney David Youdovitz. "He seems to understand how serious this is."

"The first time," Paul says, referring to the engineering school incident, "I didn't think much about it. This time, I learned more."

Paul still spends a lot of time at his computer, but he has other hobbies like swimming and downhill skiing. And he has a girlfriend, whom he met by computer on an electronic bulletin board.

Computers remain a great interest. He knows several languages, including BASIC, COBOL and Pascal, and is learning more. He's built some of his own hardware, including a memory board for his new VIC-20, and he is spending a lot of time trying to find out more about his own TRS-80.

"Before," he says, "I was learning about *other* people's computers. Now I'm learning everything about my own. It's like the job of a detective, finding out how this thing works and finding ways to do things that are easier and faster. That other stuff isn't worth the trouble it gets you." ◘

JOSEPH B. TREASTER, a staff reporter for The New York Times, *has covered the 414s since the computer break-ins were discovered.*

Computer Break-ins

How Break-Ins Happen

And How They're Being Stopped

© HOWARD BERMAN

BY JIM LEWIS

For a while last year, it seemed like teenage computer break-ins were happening almost every 15 minutes.

After Paul and the other 414s were caught in Milwaukee, the government and the news media started discovering break-ins across the country. From California to New York, F.B.I. agents were knocking at doors and coming in through windows to stop young hackers.

Everybody started comparing these kids to the teenage hacker character in last summer's hit movie *WarGames*. Some even blamed that movie for creating the break-in furor.

Whether or not Hollywood and the 414s created this situation, computer break-ins are now an issue of real public concern: Are the break-ins harmless pranks or are they dangerous? Can mainframe computers be made secure? Will those who break into computers roam free or be caught and punished?

"No matter what you think about what the 414s did," says one computer security expert, "they certainly helped focus a lot of light on a serious problem."

Mainframe computers—the machines that handle vast amounts of data for many institutions—are often hooked up to telephone lines. This lets authorized users gain access without having to go to the building where the mainframe is kept. These users are given special

Break-ins are increasing as more people get their own computers and modems.

identification codes and passwords so the computer will recognize them and let them in. The systems are set up to be easily accessible for authorized people. But as a result, unauthorized users have been able to get "into" these computers.

"Security is a real balancing act," says Julius Cohen, head of computer security for the Grumman Corporation. "Our people need access to the computer to do their job. They need access from different locations. The greater the access, the greater the security threat."

Unfortunately, some security around mainframe computers has been very lax. Often the same, very common, passwords are used in hundreds of systems. "In three of the systems we got into, the user name and password were the same," recalls one of the 414s.

That kind of loose security is like leaving a "key in the lock on the front door," says Geoffrey Goodfellow, security expert and co-author of the new book, *Hacker's Dictionary—A Guide to the World of Computer Wizards*.

Now, following all the publicity about break-ins, many mainframe operators are beefing up security. Passwords are being changed more frequently. Companies like Grumman and AT&T are buying equipment that encodes information and keeps unauthorized users out of the computers.

"Total security is not practical," admits Donn Parker, security expert with SRI International in California. But, he adds, the right combination of hardware, software, physical and procedural controls should be able to stop most break-in attempts.

And, should someone be able to break through this security, there are now ways to identify the culprit. The F.B.I. uses a method known as "trap and trace." By hooking up special equipment to the computer, they can identify the location of those attempting to illegally break-in.

MAKING IT ILLEGAL

Computer break-ins are a new kind of crime. When the 414s broke into mainframes last year, there was no federal law designed to punish that kind of break-in.

This situation is changing. Several federal laws are under consideration. One of these laws will even set up a task force to advise small businesses on how they can protect their computers from unauthorized entry. In addition, more than 22 states have passed laws which make breaking into a computer a punishable crime.

In the 414s' home state of Wisconsin, for example, a proposed law would make life-threatening break-ins punishable by up to a $10,000 fine and 10 years in prison.

"When [the people who break into computers] understand that this is not going to be treated as a prank, but prosecuted as a crime, they'll think twice before trying it," says Geoffrey Goodfellow.

Stronger laws and tougher security may have arrived just in time. "The size of the problem is increasing as terminals, modems and micro computers become more available," says Donn Parker.

It is impossible to tell exactly how many break-ins have taken place, according to Jay BloomBecker, director of the National Center for Computer Crime Data in Los Angeles. Many of the companies that have their computers broken into are "embarrassed" that it has happened and fear that "reporting the crime will lead other [hackers] to try to imitate the break-in," he says.

Even though only some of the crimes are reported, BloomBecker agrees that millions of dollars are lost each year because computers have been illegally entered and tampered with. Is there a chance those who break in could cause a real catastrophe—like the nuclear war that almost happened in *WarGames*? Computer experts think the chances of this are very remote, but BloomBecker believes that "You'll see a billion-dollar loss because of computer break-ins" before the end of the 1980s.

More than money is lost, however, when computer break-ins take place. These break-ins are also an invasion of privacy.

Breaking into a computer is "trespassing on someone else's rights," says John Markoff, senior editor of the computer newsweekly *Info World*.

"Don't do with computers what you would consider immoral without them," says Joseph Weizenbaum, computer science professor at the Massachusetts Institute of Technology. "An act does not gain morality because the computer has made it easy to achieve."

Computer Break-ins

GOING STRAIGHT

A Hacker Turns from the 'Dark Side of the Force'

© HOWARD BERMAN

Geoffrey S. Goodfellow is a hacker. Today, this 27-year-old works as a principal investigator with a company that develops computer security systems. But he began his career breaking into other people's computers, working for what he calls "the dark side of the force."

In Washington, D.C., at last fall's Congressional hearings on computer break-ins, Goodfellow described how he went from being an "unsavory" hacker to using his considerable computer hacking skills for good purpose. ENTER presents an adaptation of his testimony.

My first experience with computers (and the world of 'hacking') came in the early 1970s when I was in seventh grade. At my school, I discovered a room full of teletypes connected to a Stanford University computer system. I started arriving at school early each day to be able to play with the computer. I would also spend my lunch hour, recess and as long as I could after school in the computer room.

Luckily, that summer I was able to hang out at the Stanford facility, which had the computer system that served our school and others. This allowed me to meet the systems designers and learn how everything worked. I quickly began to develop a keen interest in how the operating system worked, and in programs only 'wizards' could run.

During the 8th grade, my parents wanted to contribute to their son's apparent avid interest in computer technology, and so bought a used teletype machine and modem from a large computer firm. I don't know how, but they managed to talk the

firm into giving me a free account for after-hours and weekend use. The firm then forgot about me. After running the usual course of computer games (which quickly became quite boring), my attention turned toward this computer's operating system. I took delight in finding ways around its protection mechanism. This was noticed by the time-sharing company. One summer evening, when they were sure it was me inside their system, the company's vice president and district manager came knocking at our door, and, in effect, said, "gotcha!" The result: I was hired to help them make their system more secure.

While working there in the summer of 1973, I met another summer hire who knew about a Department of Defense computer network, called the ARPANET. My new-found friend passed me a dial-up number and a few commands that would allow me to connect with various systems on the network.

In these early days of the ARPANET, the majority of the computers had 'guest' accounts on them with obvious and published passwords. This was done in order to promote the free use of resources and to let users of the network have a chance to explore, learn and use the systems. Needless to say, this was a gold mine that no hacker could pass up. So I spent the better part of the summer learning and using as many different computer systems as possible.

A HACKER'S DREAM

One of my favorite systems was the guest account on a computer called SRI-AI, which belonged to the Stanford Research Institute's Artificial Intelligence Center. I made

> *"I took delight in finding ways around computer security...then I got caught."*

it a point to get to know the operations of this system as well as I could in hopes that perhaps someday I might have an account of my own. Well, that day came when I logged into the public guest account, and out popped a message saying, "Welcome to the SRI-AI computer public guest account. If you think you have a need for your own account, send a note to the system administrator explaining your need."

This invitation was just too good to pass up, something I had dreamed about. So I sent a message saying I was a hacker who had spent time on the public guest account learning about their system. I said I wanted to have an increased level of access, and an area in the computer to store my own files. In return, I would use my hacking to find ways to improve the system's capabilities.

After some initial doubt, the systems administrator granted me an account. This allowed me to make SRI-AI my home base. I immediately proceeded to hack away to my heart's content, now that I had become a legitimate network user. After demonstrating my competence and a sense of responsibility, I was granted system privileges—in other words, access to all systems resources. This permitted me to learn and develop a further understanding of the system. I hung around SRI for about nine months and was given a building pass. This allowed me to come and go at odd hours—the hours hackers are known to keep.

Then, there was an opening for a part-time weekend computer operator's job. Since I had demonstrated my competence, I was immediately hired. I continued to work at SRI and became a full-time employee.

HELPING HACKERS

Unfortunately, this is not the way most hackers would be dealt with today. An organization would most likely try to stop entry into its system by erecting barriers. This reaction is precisely the wrong approach to take, because hackers will notice beefed-up defenses and see them as a challenge to their prowess.

Instead, organizations should try to befriend hackers who have penetrated their inner sanctums. Hackers should be asked: "Is it helpful or useful for you to do this?" rather than "Are you authorized to do this?" You must, in effect, come down to the hackers' level. Show them you appreciate their talents. If you take a genuine interest in what they're doing, most of the time you'll find they're more than happy to tell you exactly what they're looking for or interested in. The hackers want to learn and you can be their guide and teacher. This is how I was dealt with by the firm that caught me during my unsavory hacking days when I breached security. I was very much inspired by this method of steering unsavory hackers towards more constructive use of their talents.

ARCADE '84

LASERS LEAD THE WAY

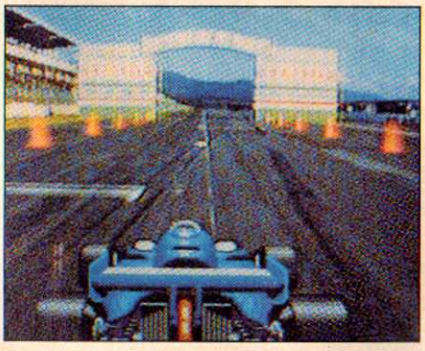
BY JIM LEWIS

When Dirk the Daring battled his way through the laser disc game *Dragon's Lair* last year, he did more than rescue the fair princess. Dirk's animated adventures changed forever the look of arcade action. The traditional blip-and-bleep games appeared dull compared to the rich animation and player control that laser games offer.

Using a tiny laser and a special record-like disc, *Dragon's Lair* was 1983's spectacular video game debut. But this year marks the real beginning of the age of the laser video disc.

Whether you want to fly through space canyons, drive around a real-life race course, or coach a football team, the laser disc is in your future. Following *Dragon's Lair*'s success, every game maker from Tokyo to Toledo has rushed to get out a new game that uses laser technology.

"Nobody wants to get caught short not having a disc game," says Walter Day, owner of Twin Galaxies Arcade and International Scoreboard in Ottumwa, Iowa. "It's what's new. It's what people will want to play."



Pole Position II *(TOP)* ***adds tracks and*** **Laser Grand Prix** ***adds live action.***

Not everyone is enthusiastic about the laser games that have arrived, though. People may try them at first, warns one veteran game designer, "but they aren't going to play again if the game doesn't offer a real challenge."

If you like your video games the old fashioned way, don't despair. Several non-laser disc games—including a few sequels—are also scheduled to appear in 1984.

The first disc sequel, *Dragon's Lair II*, is still on the drawing board. But the man who created the first disc game, Don Bluth, does have a new game. It's called *Space Ace* from Cinematronics and it puts you in control of the animated adventures of a young

INITIAL CAPS© BRAD HAMANN

ace named Dexter. Traveling through time and space, Dexter has one power that Dirk the Daring never dreamed of—at certain points in the game, he can become Super Dexter and be invulnerable to attack.

If you like animated action, then *Cliff Hanger* from Stern and *Badlands* from Konami/Centauri should catch your eye. *Cliff Hanger* (see "Game Plan," this issue) is controlled by joystick and action button, just like *Dragon's Lair*, but the new game includes a warning voice that tells you when to make your move. *Badlands* pits good guy Buck against evil Landolf and his gang. There's no joystick—just an oversized action button that you hit whenever a bad guy appears.

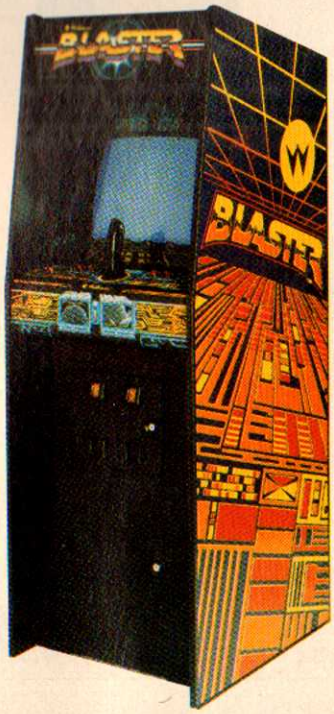
fter you've had your fill of cartoon capers and split-second decisions, then it's time to join the football team. *NFL Football* from Bally and *Goal to Go* from Stern give new meaning to sports action video games. Both use laser disc technology with live action film from actual games. *Goal to Go* shows unknown players, but *NFL Football* features film footage from pro games.

The football field isn't the only place you'll see live action in the arcade. Three of the laser disc flying games and one of the driving games also put you in the middle of live movie action.

M.A.C.H. 3 from Mylstar gives you the choice of flying a bomber or jet fighter plane. The animated images of these aircraft are superimposed over film depicting "enemy targets." And just in case you aren't good at enemy spotting, target outlines show you where to aim.

Astron Belt from Bally puts an animated aircraft into an outer

Astron Belt ***is finally in the arcades after extra time on the drawing board.***



Blaster, ***one of the rare laser-less games, is an all action space flight.***

space movie. This game was supposed to debut last year (see ENTER, October, 1983) but technical bugs kept *Astron Belt* on the launch pad. Bally promises it's been "breathtakingly perfected."

Firefox from Atari puts you at the controls of a supersonic aircraft in the middle of a Clint Eastwood movie. The game uses footage from the Eastwood movie of the same name, but differs slightly from the script. In the game, you control flight with hand controls. In the movie, a pilot could control flight using only brainwaves.

"I'm afraid we're not quite that far yet," admits Atari's Robert Rowe, who helped design the game's hardware.

When you want to get your feet—or at least your wheels—down on the ground, you can step behind the steering wheel of *Laser Grand Prix* from Taito. This laser disc game has an animated race car superimposed onto a real racetrack. And it is quite realistic: "I was in a cold sweat by the time I finished the race," says ENTER gamester Phil Wiswell.

riving or flying through movies can put you in some strange places, but none will be stranger than the places you discover in Williams' *Star Rider* and Simutrek's *Cube Quest*. Both games feature worlds that are computer-created. *Star Rider*'s race through Hexagonia, Cubitania and Stalactica were created by Computer Creations, a computer animation company. *Cube Quest*'s kaleidoscopic flight scenes were designed by Robert Abel and Associates, who did some of the special effects for the movie *Tron*.

"We wanted a game that looked like everything belonged in it," says

ARCADE '84

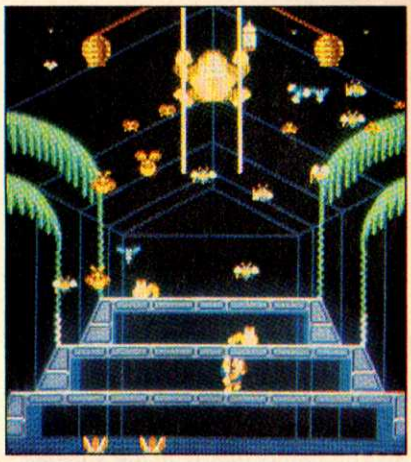
Paul Dussault, Williams' special projects director. "It's not like you're watching a movie and moving a cartoon around in it.... (*Star Rider*) puts you in a world that springs from the imagination."

his talk about laser discs may leave you longing for the good old days of gobbling dots. Then make way for Junior. That's *Jr. Pac-man* from Bally. This beanie-topped offspring of Mr. and Ms. P features seven horizontal-scrolling mazes that are twice as wide as before and bonus pellets worth 50 points. Best of all, when you clear a maze, you help Jr. win the heart of Yum-Yum, offspring of the ghost monsters who live next door.

Donkey Kong and Mr. Do are also back for more. In *Donkey Kong 3* from Nintendo, Mario has been replaced by Stanley the Bugman, who uses a sprayer to keep Bussbees, Beespys and Creepies under control and to get Donkey Kong to climb the vines. In *Mr. Do's Castle* from Universal, that pounding clown has left the orchard to climb the castle walls and eliminate evil unicorns. The play field is different, but many of the rules from the original *Mr. Do* remain the same.

One sequel you may have to look at twice is *Pole Position II* from Atari. It's identical to *Pole Position* except for the three new tracks for you to maneuver.

You'll have to look thrice when you see *TX-1*, from Atari. This game features graphics almost identical to *Pole Position*, with a big difference—three screens! The race track literally surrounds the driver.



Donkey Kong 3 *(TOP)* ***goes ape and Granny and the Gators plays pinball.***

There's a slight break between each screen, but when you're barreling down the straightaway and down shifting for the curve, you don't have a chance to notice.

Another total sensory experience in the non-laser disc field is *Blaster* from Williams. This full-color, first-person, space flight simulation has only one screen, but still seems to come at you from all sides. Whether you're in Saucerland, the Robot Grid, or among the Planetoids, there's barely a moment when something isn't flying right at you.

Atari's *Adventure of Major Havoc* may be a less harrowing experience, but this vector graphic space adventure certainly has a sense of humor. You've got to be quick in leading the Major through his battle with the Vaxxian Empire. Otherwise, he turns toward you, folds his arms and taps his foot impatiently. Ready when you are, Major.

hether laser disc video games are just the latest wave or the shape of things to come, you can be sure there will be a pinball game somewhere in your local arcade. In *Granny and the Gators* from Bally, the old pinball game has been merged with a video game adventure. You play part of the game on a video screen and the rest hitting silver balls around a pinball playfield. Let's see Dirk the Daring try that!

JIM LEWIS is senior editor of ENTER.

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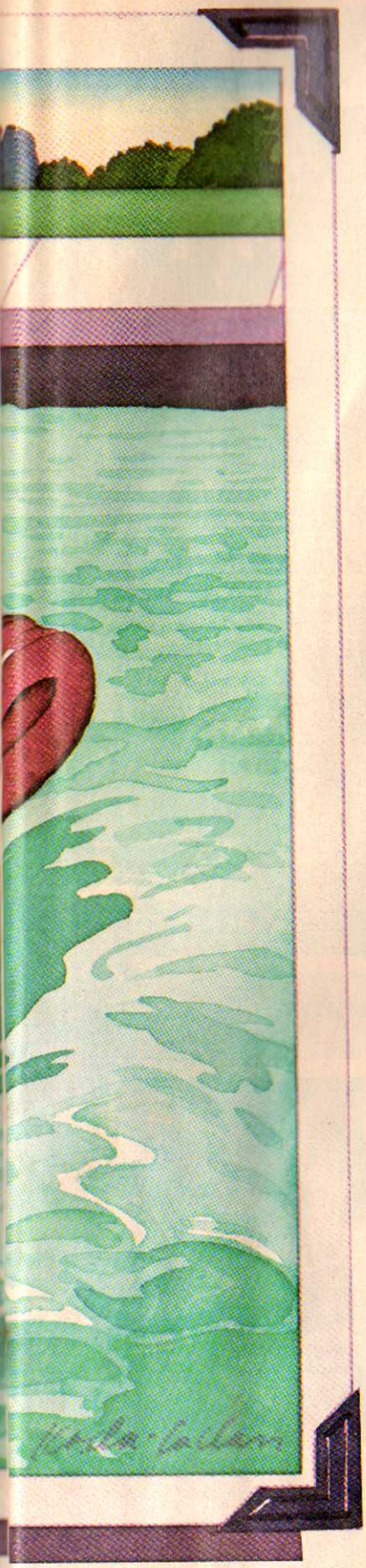

COMPUTER CAMPS

GETTING THE BUGS OUT OF YOUR SUMMER SELECTION

BY ELIZABETH HETTICH

Summertime seems a long way off, but kids all over the country are already busy making their summer plans. Many of them are getting ready to take part in the latest summer fad—computer camp.

A few years ago, everyone wanted to be a tennis pro, and tennis camps were the fad. Now, computer programmers are heroes, and computer camps are very "in." But just as you didn't need to go to a fancy tennis camp to improve your game, you don't have to go to computer camp to learn about bits and bytes this summer.

"Computer camps certainly aren't the only, or even necessarily the best, way to learn about computers," says James Finklestein, director of "Summer Tech 83," a computer program held in Columbus, Ohio, last year.

Sleep-away camps may cost as much as $900 for a two-week session, but there are many lower-priced alternatives. More and more schools, colleges, computer clubs and Y.M.C.A.s are offering classes, workshops and day-camps that are educational—and fun—at as little as 1/10th the price of sleep-away camp.

What can you expect to get for your money, wherever you go? "That really depends on how much you're willing to put into it," says Greg Trautman, 17, who was a counselor at Computer Camps International last summer. "You're not going to learn just by being there, but if you want to learn a lot, you will."

Much of what you're going to learn depends on your level of computer savvy before you go to camp. If you're a beginner, you might learn how to program in BASIC, write simple games and make graphics. More advanced students will learn complex languages and programming techniques. One thing is for sure: if you're enthusiastic, you're going to learn a lot. "After all," says camper Linda Hermann, 13, "when you're spending at least four hours a day programming or in a classroom learning to program, it would be very hard not to learn."

CHAMPLAIN COLLEGE COMPUTER CAMP

Best byte of the day

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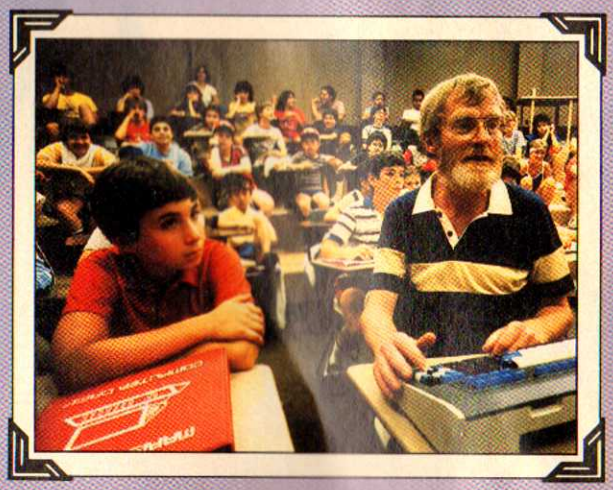


Down to BASICs

NATIONAL COMPUTER CAMP

Computer tutor

© ROBERT KNOWLES

Sync or swim

NATIONAL COMPUTER CAMP

Boot it up

NATIONAL COMPUTER CAMP

Campers on-line

WHAT TO LOOK FOR

Getting a lot out of your summer, however, doesn't depend only on how much you're willing to put into it. The quality of the camp or course you choose, and how well-suited it is to your needs, are just as important. Here are some specific things to look for, ask about, and beware of, in looking for the right computer summer experience.

HARDWARE: Be sure to ask what type of computer the camp or school uses. According to 13-year-old Amie Strong, who went to camp last summer, it's important to find a camp that offers you time on a computer that you'll also have access to when summer is over. "Otherwise," says Amie, "it's frustrating and kind of a waste—because you'll never have a chance to use what you've learned again."

Many schools and camps use more than one type of computer. If this is the case in the ones you're considering, it's important to ask if you can choose which machine you'll be using.

COMPUTER/STUDENT RATIO is another consideration. Most experts agree that the ideal student-computer ratio is one-to-one. That way, you can work at your own pace. Some people, though, believe that working in pairs on the computer has certain advantages. Frank Mazzola, instructor at National Computer Camp and Director of Computer Camp for the Physically Disabled, comments that "it becomes more sociable when kids work in pairs. There's more interaction between them and they tend to share their ideas."

If the ratio is higher, be careful. More than two on a computer "might be a disadvantage," cautions Michael Zabinsky, director of National Computer Camps. "It could be frustrating and disruptive, and some kids might not get enough time on the computer."

THE INSTRUCTION: Most camp directors agree that instructors with teaching experience are better teachers than computer graduate students. Grad students, they say, may know a great deal about computers but little about communicating with kids.

"There's a huge difference between teachers and non-teachers—it's like night and day," says Clark Adams, Director of Education at New England Computer Camp. "Teachers know how to work with kids and give them the attention they need." But Adams does feel there's a place for graduate students, particularly as assistant instructors. "The best system we've found is to pair up a teacher who has some computer experience with a hot-shot computer grad student as an assistant. This works—it's a dynamite combination."

RECREATION: A good recreation program is an important, and often neglected, aspect of computer camp. Greg Trautman believes that "computing must be balanced with recreation—four hours of straight computing is enough for one day." And Amie Strong agrees: "After staring at a computer screen for a few hours, your eyes get all blurry and you really need a break." Check carefully—there are camps that don't have facilities for recreation. Some don't even have a swimming pool.

FELLOW CAMPERS: Find out the age range of kids that the camp or school tends to attract. If you're a 16-year-old computer novice, are you going to find yourself sharing a computer with a nine-year-old hacker? Or are you going to be the only girl in a classroom full of boys three years younger than you? Many of these factors change from session to session and are hard to predict—but ask a camp for its track record. That will give you some idea if there will be other campers with whom you'll share more than an interest in computers.

KNOW WHAT YOU WANT

Once you've weeded out the good camps from the bad, narrow down your choices by deciding what you're interested in learning and which camps offer a program that suits you. Fourteen-year-old Mark Gannon had been designing games for years. He decided to attend National Computer Camp because it offered courses in Assembly, the language most arcade games are written in. "I ended up not only learning Assembly," he recalls, "but also meeting other kids who like to make games." Amie Strong found the "marvelous balance" between computers and recreation to be the highlight of Computer Camps International. And Jared Gross chose Marist in Poughkeepsie, NY, because that camp devoted a lot of time to graphics.

A TYPICAL DAY

A typical day at a computer camp starts at around 8:00 A.M. with breakfast in the mess hall. At 9:00, classes begin. The campers may alternate between the computer room and a classroom, where programming lessons are sometimes taught before they are tried out on the computer. At 11:15 a bell

rings, signalling the end of classes. This is free time, which can be spent on the computer or taking a swim, writing a letter or talking to friends. Lunch is at 12:15. Then it's back to class. At 3:00, classes end and there's more free time. The choice may be between a softball game or blindman's-bluff at the swimming pool. Dinner is at 6:00 and then maybe a movie or a ping-pong tournament. Lights out is at 10 PM. Though this schedule changes a bit from camp to camp—some require more time away from computers—most computer camps give you a minimum of four hours a day at the keyboard. Many camps offer evening workshops and lectures in robotics, computer careers, word processing, and more. Others offer more extensive recreation programs, with a staff hired specifically for after computer hours.

FINDING THE RIGHT ONE

While word of mouth will get you started on your search for the ideal

KEYBOARD CAMPING: ENTER's Guide to Summer Computing

NAME	LOCATION (ADDRESS)	SESSION LENGTH, COST*	NO. OF CAMPERS, AGE RANGE
NATIONAL CAMPS			
ATARI CAMPS 800-847-4180 In New York City: 212-889-5200	Greenfield, MA; E. Stroudsburg, PA	2 weeks, $990 4 weeks, $1790	100 campers, 10-16 years old
COMPU CAMP 800-328-4815 In MN: 800-752-4249	St. Paul, MN; Omaha, NE; Newburg, OR; Beaver Falls, PA; Dallas, TX; Kenosha, WI; Additional sites planned	1 week, $425 2 weeks, $850	50 campers, 9-17 years old
COMPUTER TUTOR CAMPS 800-227-2866 In CA: 415-461-7533	Palo Alto, CA; Woodside Priory, CA; Williams, NH; Swarthmore, PA	2 weeks, Day camp $550 Overnight $885	30 campers, 11-17 years old
NATIONAL COMPUTER CAMP 203-795-9667	Simsbury, CT; Atlanta, GA; St. Louis, MO; Cleveland, OH; McMinnville, OR	1 or 2 weeks, $380 per week	150 campers, 9-18 years old
ORIGINAL COMPUTER CAMP 800-235-6965 In CA: 800-824-3349	Santa Barbara, CA; Sequoia Lake, CA; Steamboat Springs, CO; Lake Winnipesaukee, NH; Additional sites planned	2 weeks, $795-$1100	From 50 to 225 campers, 7-15 years old
REGIONAL CAMPS			
ARIZONA COMPUTER CAMP	2946 Darca Drive Prescott, AZ 86301	1 or 2 weeks, $270 per week	55 campers, 8-15 years old
BLUE RIDGE COMPUTER CAMP	P.O. Box 2026 Albany, GA 31702	1 week, $375	20 campers, 10-17 years old
CHAMPLAIN COLLEGE COMPUTER CAMP	P.O. Box 670 163 S. Willard St. Burlington, VT 05402	2 weeks, $825 4 weeks, $1600	150 campers, 10-16 years old
COLOR COUNTRY COMPUTER CAMP	c/o Dixie College 225 S. 700 East St. George, UT 84770	6 days, $300	20 campers, 10-16 years old
COMPUTER CAMP AT YELLOW RIVER STATION	Yellow River Station Monona, IA 52159	5 days, $225	12 campers, 10-15 years old
MARIST COLLEGE COMPUTER CAMP	Marist College Poughkeepsie, NY 12601 Attn: Larry Menapace	2 weeks, Day camp $490 Overnight $850	75 campers, 10-17 years old
NEW ENGLAND COMPUTER CAMP	Banner Lodge Moodus, CT 06469	2 weeks, $895	150 campers, 8-17 years old
UNIVERSITY COMPUTER CAMP	2480 Crooks Rd. Troy, MI 48084	2 weeks, $795	80 campers, 9-18 years old

All information current as of December 1983.

*Unless otherwise noted, costs are for sleep-away camps.

computer camp, there are many other ways to get information about camps. To start you off, ENTER has put together a guide to selected camps across the country (see chart below).

If you'd like more information, the American Camping Association publishes a yearly guide to accredited U.S. camps. Although many computer camps are not accredited, those that have been will be listed here. Another source is *The Computer Camp Book*. This guide lists a number of classes, camps and workshops. It's available (for $12.95, plus $2.00 postage) from: The Computer Camp Book, P.O. Box 292, Yellow Springs, Ohio, 45387.

Using all these sources, you should have no problem locating the camp of your dreams. Once you have, pack up your bags and get ready to go—but don't forget to sew name tags on your floppy discs!

ELIZABETH HETTICH is assistant editor of ENTER.

BOY-GIRL RATIO	HARDWARE, CAMPER-COMPUTER RATIO	LANGUAGES TAUGHT	TYPE OF INSTRUCTION, HOURS PER DAY
3:1	Atari computers, 2:1 ratio	BASIC, PILOT	Instructors have computer teaching backgrounds. All camps ACA.**
3:2	Apple II, Atari, Commodore 64, IBM, Radio Shack, Texas Inst., 1:1 ratio	Assembly, BASIC, LOGO, Pascal	Instructors have teaching and computer background. 7 out of 9 locations. ACA**
2:1	Apple II, IBM PC, 2:1 ratio	BASIC, LOGO, Pascal	Instructors have teaching and computer backgrounds.
5:1	Apple IIe, TRS-80, 2:1 ratio	Assembly, BASIC, Pascal	Instructors have teaching backgrounds.
4:1	Apple II, Commodore 64, 1:1 ratio	Assembly, BASIC, Forth, LOGO, Pascal	Instructors are computer science grads and undergrads. All camps ACA.**
2:1	Apple II, 1:1 ratio (for instruction)	BASIC, LOGO	Instruction by teachers, 3 hours a day.
3:2	Apple IIe, 2:1 ratio	BASIC, LOGO	Instruction by teachers and computer majors, 6 hours a day.
3:1	Commodore (64, PET, Business Mach.), IBM System 34, 1:1 ratio (for instruction)	Assembly, BASIC, FORTRAN, Pascal	Instruction by computer teachers, 4 hours a day. ACA.**
3:1	Atari 800, Apple II+, Franklin Ace 1000, Commodore 64, 1:1 ratio	BASIC, LOGO, PILOT	Instruction by teachers, 4 hours a day.
Not Co-ed: Sessions alternate between boys and girls	Apple IIe, 2:1 ratio	Assembly, BASIC	Instruction by teachers, one hour a day.
3:1	Apple IIe, IBM, TRS 80, IBM 4341 mainframe, 1.5:1 ratio	APL, BASIC	Instruction by computer grad students, 4 hours a day.
2:1	Apple IIe, MacIntosh, IBM PC, 1:1 (for instruction)	Assembly, BASIC, Forth, LOGO, Pascal. Plus, by request: C, FORTRAN, LIST	Instruction by teachers and computer students, 4 hours a day.
3:1	Apple IIe, 2:1 ratio	BASIC, LOGO, Pascal	Instruction by teachers, 4-6 hours a day.

**Accredited by the American Camping Association.

INFORMATION COMPILED BY ELIZABETH HETTICH

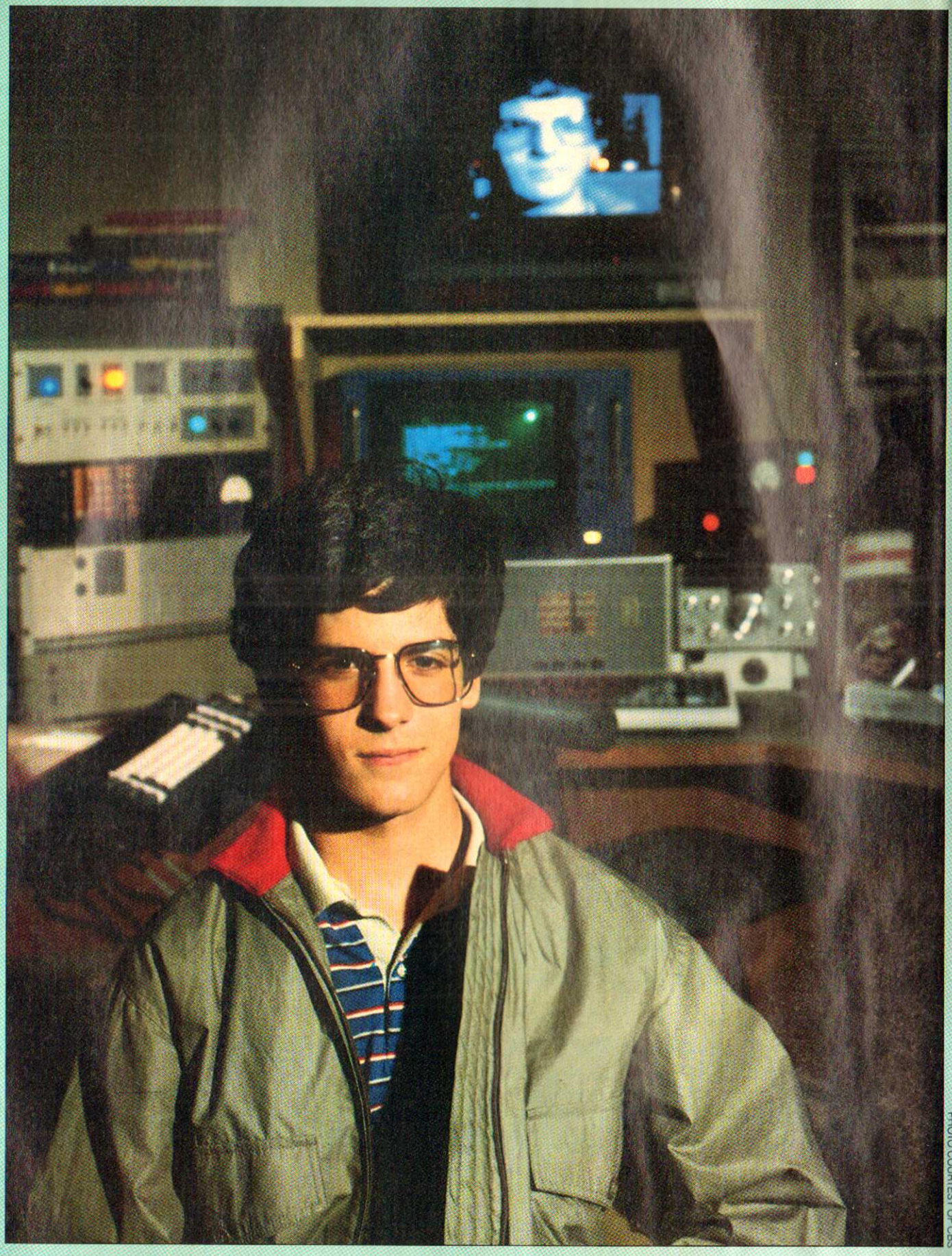


PHOTO COURTESY OF CBS

THE MAKING OF TV'S 'WHIZ KID'

MATTHEW LABORTEAUX LEARNS WHILE HE EARNS

BY KEN WILSON

All last fall, *Whiz Kids*—the CBS-TV series about the adventures of four crime-fighting teenage hackers—floundered near the bottom of the TV ratings. The show's producers, technicians and cast lived with the job insecurity that goes hand-in-hand with working on a "bottom 30" TV show. Would the network allow them to survive?

After much hemming and hawing, CBS finally made a decision. In mid-December, *Whiz Kids* was given the green light for the rest of the 1983-84 season.

RICHIE ADLER'S ALTER-EGO

No one was more relieved than the show's 17-year-old star, Matthew Laborteaux. Having already starred in one cancelled series *(Little House On The Prairie)*, Matthew was no newcomer to the ups and downs of network television. "When you're an actor, you have to learn to live with uncertainty," he says. "I'm just glad the network's giving *Whiz Kids* another chance."

On *Whiz Kids*, Matthew plays hacker Richie Adler, a teenager who is technically skilled enough to have built his own talking computer—nicknamed Ralf—out of spare parts. With Ralf, Richie and his friends Hamilton (played by Todd Porter), Jeremy (Jeffrey Jacquet) and Alice (Andrea Elson) are able to access any computer in the country. Their activities are overseen by a couple of leery but friendly adults: newspaper reporter Lew Farley (Max Gail, late of *Barney Miller*) and police detective Neil Quinn (A Martinez).

While a lot of the action on *Whiz Kids* takes place "on location" all over Southern California, the show centers on Richie's attic bedroom. It's the domain of Richie's generic computer system. (For more on the technical side of *Whiz Kids*, see "Behind the Screens.") The room is actually in a small corner of Los Angeles' Universal Studios' cavernous Stage 31. It's just a few hundred yards from where the Universal tour bus stops.

(Continued on next page)

***Matthew plays Richie Adler, hacker and kid crime fighter, on CBS's* Whiz Kids.**

> ***'During breaks in shooting, I'll sit down at the Apple and study BASIC and LOGO."***

In some ways, Matthew notes, Richie is just like him. "Richie is the kind of guy who's so wrapped up in his computer that he forgets about eating and sleeping," he says. "I guess I'm sort of the same. When I decided to get into bowling for the first time," he laughs, "I bowled for 11 hours straight. My right thumb was like ground beef; I had to rest it for a month."

NOT A WHIZ KID

Even though he identifies with Richie's intensity, Matthew was anything *but* a computer whiz kid when the series began. He became computer literate, however, with the help of the show's Apple IIe and his own Atari 1200XL—a computer given to him by the manufacturer.

Prior to *Whiz Kids*, Matthew's only computer experience had been as a regular competitor at Atari video game tournaments. On the strength of his video gamesmanship, Atari asked him to be a "good-will ambassador" for the company. *Asteroids, Defender, Pac-Man* and *Centipede* tournaments followed (Matthew was ranked 10th nationwide in *Centipede*). Finally, Atari invited him to become a member of the company's Youth Advisory Board.

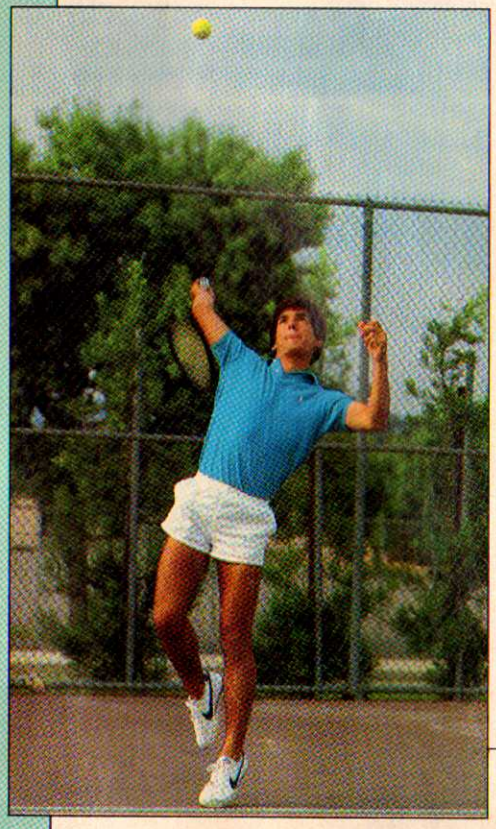
Joining the Youth Board had a special benefit for Matthew: Atari sent everyone on the Board their new 1200 XL. "Thanks to the 1200," Matthew says, "I learned how to type before *Whiz Kids* began shooting. That made my character at least *look like* he knew what he was doing." Matthew's real computer learning didn't occur until he got on the set. "On my lunch hour, or during breaks in shooting, I'll sit down at the Apple and learn—primarily languages like BASIC and LOGO."

While Matthew's hands-on computer experience hasn't given him the computer expertise of his TV counterpart Richie, he still plans to use his knowledge while working with Atari. "All the Board members just got modems," he says. "Now we'll be able to communicate without having to meet face-to-face. We'll also be able to contact the company with any suggestions or comments about new equipment or procedures. I'm looking forward to that."

Not all of his spare time is spent on computers, however. Matthew also serves as a spokesman for the Youth Rescue Fund, a national group that helps teenage runaways. Recently, he and his brother, Patrick, were invited to Washington, D.C. to speak on behalf of the organization. Matthew and his brother are adopted children, and their talk focused on the special problems of adopted runaways. "Later this year," Matthew adds, "we're going to Washington to meet with the President."

THE FUTURE OF 'WHIZ KIDS'

It remains to be seen if *Whiz Kids* will still be on TV later this year. The show's fate hinges on how well it does in its new time slot. But Matthew is optimistic: "It takes time for a show to find its audience," he says, "I'm hopeful *Whiz Kids* will do it."



© JOE DOHERTY/MEGA PRODUCTIONS

Matthew's real-life talents run to sports like tennis and bowling.

KEN WILSON covers show business stories from Los Angeles.

BEHIND THE SCREENS: A HIGH-TECH TRIO MAKES RALF RUN

As anyone who watches *Whiz Kids* knows, Richie Adler's talking computer set-up, Ralf, includes two TV monitors, a keyboard, a printer, a visually activated security system and a robot arm. The system actually works—but it's not the actors who make it run.

Whiz Kids' real computer wizardry is handled behind the scenes by three technical advisors: David Gunn, 28, a microcomputer consultant; Kurt Borg, 26, a specialist in mini and mainframe computers; and Jim Michaels, 22, who has a data processing background.

While Matthew Laborteaux is acting—and typing away—as Richie, one of the three tech consultants is stationed at an Apple IIe or a Heathkit Zenith Z100, both of which sit behind Richie's bedroom wall. "These two relatively inexpensive computers do it all," says David Gunn, the head advisor.

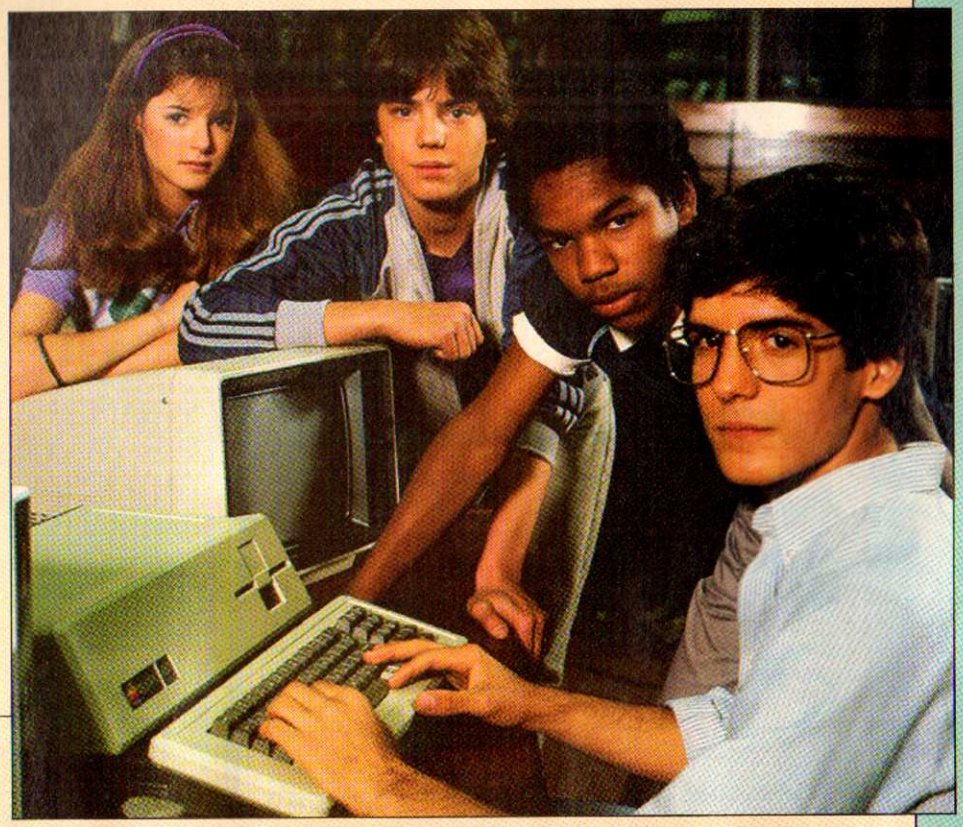
Two of the more impressive effects on *Whiz Kids* are Ralf's robot arm and the computer's unique speaking voice. The robot arm (a Mini-Mover 5 from Microbot, Inc.) tends to show off. It does things like feed Richie sandwiches and sprinkle fish food in his computer room aquarium. Says Gunn: "The robot arm is programmed by computer, and it really works."

Ralf's speaking voice is real synthesized speech. "A Vortex Speech System gives Ralf his distinctive computerized voice," Gunn explains. "Up till now, most shows have settled for the voice of an actor they've tried to pass off as a computer. But Ralf really does speak."

The digitized photographs of the stars of the show, which appear in the opening of each episode, are also real. David Gunn breaks down the process this way: First, the faces of the actors are photographed. Then these images are fed into the Apple IIe and sent through an image synthesizer called a "Photocaster." The Photocaster takes a video (or film) image, stores it on a disk, then translates it into a computerized image. The result is a high-contrast, digitized image.

The producers of *Whiz Kids* have encouraged the writers to incorporate as much state-of-the-art equipment as possible, including robots. "Recently, we've used an RB5X robot—which is kind of a real-life R2D2," says David Gunn.

Whiz Kids' advisors and producers say they are trying hard not to let the show's science stray into science fiction. "There's a tendency in TV to make things far out so that the story won't get bogged down," notes Gunn. But so far, he says, the only actual stretching of reality on *Whiz Kids* has been in the area of visual effects. "We added a few more lights to Ralf than you'd find in a comparable real-life computer system," he admits. "But otherwise, we're pretty careful." —*Ken Wilson*



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HIGH-TECH HIT MAKER

ARTHUR BAKER USES COMPUTERS TO CREATE BEAT-BOX RECORDS

BY STAN SOOCHER

When you walk into a record store
And listen to the tunes
The chances are you'll hear a rap
That gets your feet to move.
Its streettalk sound is hard to miss
Its dancing beat divine
Just let yourself fall in the groove
We're sure you'll do just fine.

Did you hear a rhythm as you read those eight lines? They make up the kind of lyric known in the music industry as a "rap." Combine a rap with a drum rhythm and electronic and acoustic instruments, and you've got "beat-box"—a style of music that's been growing in popularity for the past two years.

This new music isn't made by traditional musicians playing traditional instruments. Instead, it uses mechanical patterns created by a machine—a drum machine, or, as it's called in street slang, a *beat-box*.

The drum machine is a synthesizer—an electronic device that creates electrical signals and sound waves, which you hear as drum beats. And what's at the bottom of the beat-box sound? Computers!

The lively jive of beat-box is sung by groups like Freeez, The Jonzun Crew, Rocker's Revenge, Soul Sonic Force, Grand Master Flash and New Edition. Most of these groups have something in common, besides their beat-box sound. That common link is their record producer, 28-year-old former disco disc jockey Arthur Baker. Arthur produced the first hit beat-box song, "Planet Rock," in the summer of 1982, and he's been producing dance tunes ever since. Some music critics are calling him "the guru of beat-box."

Recently, Arthur was at the Unique Sound Studio in New York City, preparing the final

BORDER ILLUSTRATION © BRAD HAMANN

mixing of "Pop Goes My Love," a song from the group Freeez. As synthesizers and computerized drums pounded madly out of the speakers overhead, Arthur sat at the MCI recording and mixing console. He moved the controls up and down, raising and lowering various instruments' sound levels. The high-tech hitmaker was putting together another danceable beat-box record.

One constant in all of Arthur Baker's records is the presence of the Roland TR-808 computerized drum machine. "I've used it on every record since 'Planet Rock'," he says.

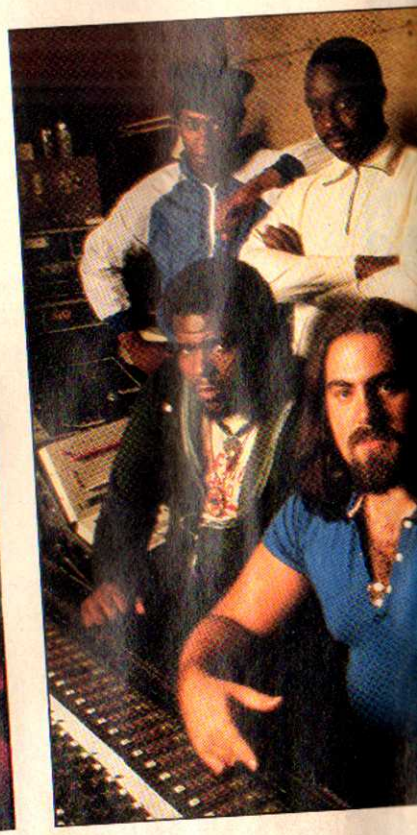
Like all drum machines (there are a number of different types), the TR-808 allows musicians to set up a rhythm pattern which they can play along with. This mechanical drummer doesn't get tired during long jam sessions, and it plays the beat perfectly. But the TR-808, unlike many other drum machines, contains a computer. That makes a big difference.

"With most other drum machines, the rhythms are pre-recorded," Arthur explains. That means the musician is limited to the rhythms recorded by the manufacturer. But with the TR-808, "you can make up the rhythms you want to use," creating new ones or variations on the old ones. That makes for more flexibility in creating the background beats.

Arthur doesn't use computers just for background music and mixing, however. One of his favorite recording instruments is the Emulator, a digital (computerized) synthesizer. On Freeez's "Pop Goes My Love," Arthur used an Emulator to rework the group's vocals.

First, the group sang into a microphone connected to the Emulator. The sound waves in the vocals were broken down into digital code, then the information was stored on a floppy disk inside the Emulator. Next, the sounds on the floppy disk were played back through a keyboard panel. By pressing different keys on the panel, a musician was able to

A. B./RETNA



change the shape of the vocal sound waves. The waves still described the notes sung by the members of Freeez—but the notes came out with odd-sounding, computer-generated variations which made words like the "Pop" in the new song really stand out.

"Working with Arthur Baker is like having an extra member of the band," says John Rocca, Freeez's 23-year-old lead singer. Freeez and Arthur collaborated on most of the album, *I.O.U.*, working long hours in the studio. "It's one of the nicest —though expensive [studio time isn't cheap]—ways to make a record," John says. "It's more fun when you have all the technology around you and you can experiment," he adds.

Arthur Baker didn't begin his musical career as a producer of dance music. In his teens, he listened to the Beatles, Jefferson Airplane and folk singer Tom Rush. Then, while working in a record store in his hometown of Boston, he began listening to soul songs by groups like the O'Jays. He decided to become a record producer, and talked a studio manager into giving him free recording time in order to gain experience.

"By 1978, I was using synthesizers to recreate strings in the songs I produced," he recalls.

Arthur also listened to the German band Kraftwerk, a group some have called the pioneers of "electro-funk" music—an electronic cousin of beat-box. "When I moved to New York, I began listening to what the kids on the street were into. I was surprised to find that they were into Kraftwerk's 'Trans-Europe Express.'"

The combination of funky, soulful street singing and mesmerizing Kraftwerk synthesizer arrange-

PHOTO © JACQUES CHENET/NEWSWEEK

PHOTO COURTESY TOMMY BOY RECORDS

LEFT: ***Rocker's Revenge.*** *MIDDLE:* ***The beat-box "guru," Arthur Baker, flanked by Soul Sonic Force.*** *RIGHT:* ***The Jonzun Crew.***

ments gave Arthur the idea for beat-box music. Two years ago, he raised $2,000. Then, working with keyboard wizard John Robie, he took a short, repetitive melodic line, (a "riff") from "Trans-Europe Express." Next, he added a vocal rap by dance club disc jockey Afrika Bambaataa, and combined that with the voices of the group Soul Sonic Force. The result: "Planet Rock," a huge hit single, went on to sell 600,000 copies worldwide.

"I brought a copy of the song to a local record store to test the response," states Arthur, who has since co-founded his own company, Streetwise Records. "When the customers flocked to the counter after just one play, I knew I had a hit. It's not a very scientific approach, but I still go to record stores to test my records."

What's Arthur's projection for the growth of computers in music?

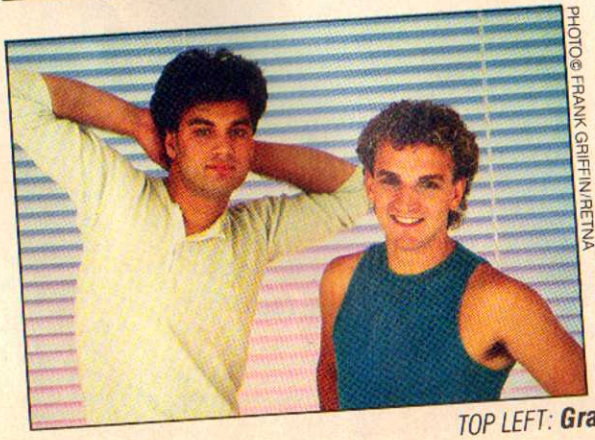
"It's unlimited," he declares as he settles back behind the mixing console to finish up work on "Pop Goes My Love." "On this MCI board, for instance, you mix the different tracks up or down and the board will remember the mix for you. That's very important when you are dealing with a complex piece of music."

How have computers changed music already? "I believe that the use of computers in music has made it possible for people who have good ideas but aren't good musicians to become great artists," Arthur responds. "*That's* where future classics of music will come from."

And what's in the future for Arthur Baker? His latest project is the sound track to a new movie coming out this summer called, appropriately, *Beat Street*. It's about the coming of age of a young rapper from the South Bronx section of New York City. Some of the tunes in the track may sound familiar. Others will be brand new. One thing is certain: You can count on all of them having a beat.

STAN SOOCHER writes about music for a number of national magazines.

PHOTO© GARY GERSHOFF/RETNA



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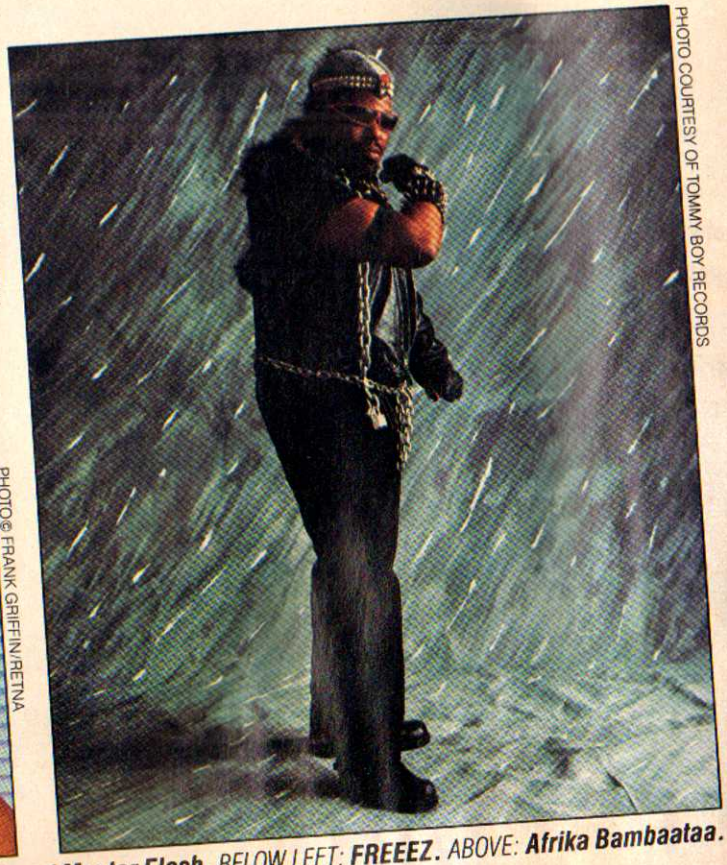

PHOTO COURTESY OF TOMMY BOY RECORDS

TOP LEFT: ***Grand Master Flash.*** *BELOW LEFT:* ***FREEEZ.*** *ABOVE:* ***Afrika Bambaataa.***

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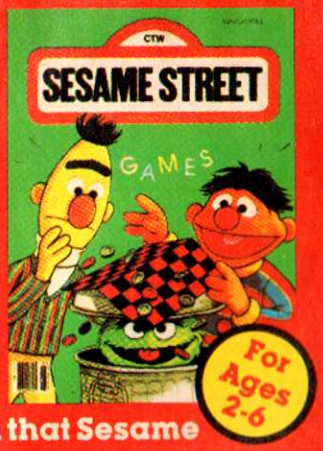

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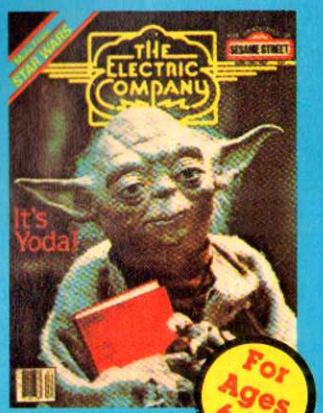

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NEW EDITION ROCKS TO BEAT BOX

BY PATRICIA BERRY

You're tuned in to your favorite FM station when a new song comes over the air. The lead singer's voice reminds you of Michael Jackson. In fact, the group sounds a lot like the Jackson 5, the popular singing family that launched Michael's career in the early 1970's. But *this* isn't music from the 70's. It has a new beat, rhythm patterns the Jacksons never had, and a tune with an electronic ring.

You've just met New Edition, five 15-year-olds who are singing to a new musical style—*beat-box* (see "High Tech Hitmaker"). All of New Edition's music, with its concentration on rhythm, is created almost entirely with the help of computers.

Singer and promoter Maurice Starr produced New Edition's album, *Candy Girl*, and is the mastermind behind their sound. He discovered the boys when they sang at one of his "Hollywood Talent Nights" in Boston two years ago. Maurice knew immediately that he had found the right voices to combine with songs he had written. Though they were only 13 years old at the time, he signed the five boys—Michael Bivins, Ronny Devoe, Ricky Bell, Bobby Brown and Ralph Tresvant—to a recording contract.

"I knew exactly what the record would sound like before I brought them into the studio," Maurice says today. The New Edition sound, he explains, is "like the Jacksons, but more rhythmic, with a heavier, louder, beat." It relies heavily on electronic drum machines and synthesizers....instruments Maurice knows well. He played *all* the instruments on the New Edition album.

In recording the album, Maurice first laid down the music. "I just go to the computer and punch in the numbers [which designate sounds on a synthesizer]. I can put a whole album into a computer in five minutes," he says. "Computers make my job easy."

At that point, New Edition came in. The boys went into the studio without rehearsing. In fact, they didn't even see the lyrics they were to sing until right before they started recording.

"It happened one step after another," explains Michael, the most talkative member of the group. "We listen to the music, then sing whatever Maurice tells us through our headphones. He keeps rewinding it and playing it back until it comes out right. Then we move on to another part of the song."

"Sometimes, we can do our own words, though," adds Ricky, New Edition's oldest member. Some of the rap on the title song, "Candy Girl,"were the boys' own on-the-spot improvisations.

"We were just messing around," recalls Ralph, the lead singer. "Maurice told us to do anything we

wanted on the last part. We did what we felt and that's how it came out."

When they're not recording hit songs, taping beat-box music videos, or touring (last summer, they were in Europe and parts of the U.S.), the boys attend private schools in Boston. They've grown up in Boston, and have known each other all their lives. In fact, New Edition began as a weekend project. Ricky, Ralph, and the others started singing together, hoping to make a little extra spending money.

They've earned a lot more money than they might have expected three years ago. What do they do with it? Well, Michael, Ralph, Bobby, Ronny and Ricky say they love to dance, listen to records, and play video games. Ronny's the video champ: 20,000 on *Bezerk*.

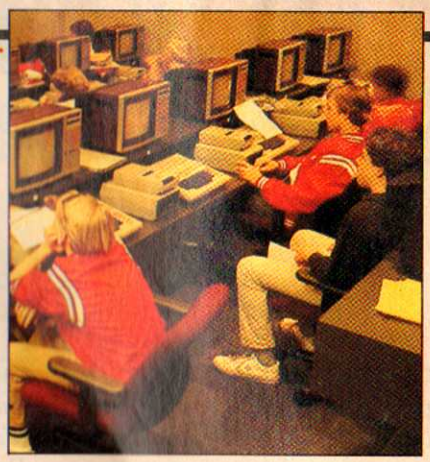
The first New Edition album yielded three hit singles ("Candy Girl," "Is This the End?" and "Popcorn Love"). The group is planning a second album, hoping their formula—Jackson 5-type sound plus beat-box electronics—will continue to be successful. Do they *like* being compared with the older Jacksons?

"Yes," Michael Bivins sums up, emphatically. "In *all* aspects." ◻

PATRICIA BERRY is associate editor of ENTER.

PHOTO© GARY SCHULTZ

New Edition: Jackson 5 melodies, electronic rhythms.



WHEN THESE KIDS

BUT DOES THE YOUTH BOARD HAVE ANY CLOUT?

BY STEVE BLOOM

Stephen Cohen doesn't believe in pulling punches. When this 16-year-old from Denver was named to Atari's Youth Advisory Board last year, he didn't want to just sit back and listen—he wanted to have some real impact.

"If Atari wanted a bunch of kids to sit around and compliment them," says Steve, "they didn't get that from us."

What the giant computer company did get were 20 tough-minded, computer literate kids from around the country offering ideas and advice about Atari's products and how their customers feel about them. In return, board members received an Atari 1200XL computer, a modem and a drawerful of Atari software.

"We think it's a fair trade," says Atari's Noreen Lovoi, who coordinates the Youth Advisory Board project. "We made it clear we wanted them to be blatantly honest with us...they have been."

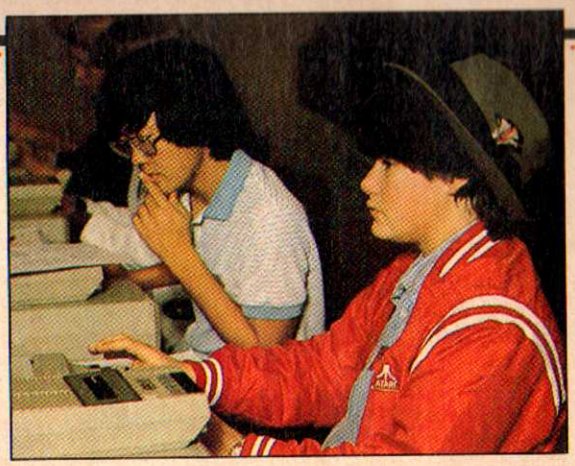
AN EXPERIMENT

Computer companies like Apple, Tandy/Radio Shack and Commodore all meet regularly with user groups and get plenty of comments from customers who call or write. But in March, 1983, Atari decided to try a different approach. It invited a select group of young people to give advice to the multi-million dollar company.

Selecting Youth Advisory Board members wasn't easy. Atari had to choose 20 people between ages 13 and 18 from among more than 120 candidates. How were they picked? Thirteen were nominated by a public relations company. Teachers were asked to contribute names to the list. Seven others had either worked for Atari, or knew someone in high places. Three board members—David Lurie, Todd Bridges and Matthew Laborteaux—had special connections. Lurie is the son of the San Francisco Giants' owner; Bridges is an actor on the TV show *Diff'rent Strokes*; And Laborteaux is a video game champ and star of TV's *Whiz Kids*.

But, claims Atari's Noreen Lovoi, *all* board members had to be computer literate—they can all program in BASIC—and also be active students with broader interests than just computers.

"I was looking for well-rounded



TALK, ATARI LISTENS

boys and girls, not computer nerds," Lovoi says. All board members have a variety of outside interests. Steve Cohen plays piano; 14-year-old Anneke Wyman dances with the New York City Ballet. And one member, Musa Mustafa, 15, has even won awards for computer-animated films he created.

"Ideally," explains Lovoi, "the kids will be able to share their thoughts, dreams, and aspirations with us and each other. We want them to critique new products before they hit the market. We won't be attaching electrodes to their brains—we just want to hear what they have to say."

WHIRLWIND BRAINSTORMING

Only a month after the selections were made in March, 1983, the Youth Advisory Board held its first meeting. Twelve boys and eight girls from 13 states were flown to Atari's corporate headquarters in Sunnyvale, California. There they met Alan Kay and other top Atari staffers. They toured the buildings where computers and software are designed and built, played Atari arcade games (for free, of course), and even got a sneak preview of a new Warner Brothers movie.

"They didn't give us any free time," says Tina Bartschat, 15, from Upper Saint Clair, PA.

Perhaps the most productive parts of the two-day meeting were the three-hour brainstorming sessions. "The first day," says Steve Cohen, "we talked about what a computer should do. The next day we were asked what we thought of Atari products."

"We were an added dimension to what they already do," says 14-year-old John Dickerson. "Atari's problem is that they don't get close enough to the consumer. We'll bring them a lot closer. But, so far, we haven't found out which of our decisions they really listened to."

The board members had lots of advice for Atari. They complained that the computer disk drive "didn't protect users against their own mistakes," that the clicking keyboard was annoying, that certain software manuals were confusing and that some software about to go on sale still contained bugs.

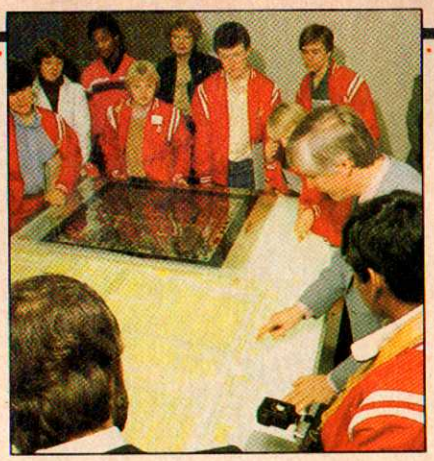
It's difficult to say what Atari will do with the advice it gets from its Youth Board.

Noreen Lovoi admits, "It's still too early to have realized any big changes....They are giving us ideas and we are listening."

NOW HEAR THIS

Atari, of course, isn't the only computer maker listening to computer users. All the other big computer companies also try to find out what customers want.

Commodore and Tandy/Radio Shack, for example, provide their user groups with information about product development and encourage comments and suggestions. Even Texas Instruments, which announced last fall that it was going out of the home computer business, continues to provide user



groups with start-up kits and lists of other user groups. (For more information, contact: Texas Instruments, Inc. PO Box 53, Lubbock, TX 79408).

In addition to its contact with user groups, Apple Computer, Inc. recently began offering special kits to help students set up computer clubs at 10,000 elementary and high schools around the country. The company sees this as a way to teach students about computer technology, says Apple's Chris Bowman. It's also a way for Apple to stay in touch with the new generation of computer users.

ON THE NETWORK

Computer makers are also using computers to communicate. Commodore, for instance, gets comments from customers who use a modem to plug into the Commodore Information Network.

Atari Youth Board members are also hooked up by modem. All members were given modems to allow them to talk to each other "on-line."

"I think it will give us a chance for more input," says Tina Bartschat.

But the modem hook-up will not replace the twice-a-year meetings in Sunnyvale, CA, or the field trip that some board members take to the Summer and Winter Consumer Electronics Shows (CES). These shows, held in huge convention centers, give computer and game companies an opportunity to display their latest products.

"The whole experience on the Board opens kids up to the many computer career opportunities," Noreen Lovoi adds.

Some board members intend to pursue computer-connected careers. Tracey Cullinan, 15, already heads his own programming company, Superior Software. He'd like to be an arcade game designer some day. And John Dickerson is helping a friend operate Bulletin Board Service, a computer network in Washington, D.C. He wants to stay involved with computer science.

But other board members are shying away from computer careers. "I want to go into science," says Tina Bartschat. "But I'm sure I'll still need to know about computers."

"Computers are a way to make a living," says Steve Cohen, "but it's not my biggest interest. I'm not sure about what I'd like to be yet—maybe a physicist."

Whatever career Steve and his fellow board members decide on, it's certain their experience as Atari Youth Advisors will have had an impact on them.

"It would be nice to work for Atari," says Steve. "People work hard, but they make money and have a good time doing it."

Besides, he adds, "I like California; it's so laid-back, you know?"

STEVE BLOOM writes about music, video games and computers.

HOW TO APPLY

When Atari Youth Board members turn 18 years old, they graduate to alumni status. That means new board members must be named to fill their spot. This year, Atari has only six advisor spots to fill, but they're interested in hearing from all candidates.

If you are between ages 13 and 17 and would like to be considered for the Atari Youth Advisory Board, send a letter to the company. Tell about your experience with computers, your other hobbies, and your reasons for wanting to be on the board.

Send to: Noreen Lovoi
Youth Advisory Board
ATARI INC., PO Box 427-e
Sunnyvale, CA 94086

The deadline is February 29, 1984.

basic training

PROGRAMS FOR APPLE, T. I., IBM, TRS-80, ATARI AND COMMODORE COMPUTERS

STOP! Don't touch that joystick! Don't bother reaching for another game cartridge. It won't do any good. Your computer will no longer respond to store-bought software. It is now under the control of programs written by a developing terrestrial intelligence—you!

Welcome to the expanded BASIC Training, where every month ENTER will print programs that put you in charge of your computer. On these pages you'll find games, graphics and other programs for the most popular home machines. Many of them were written and sent in by our readers. All of them have been tested by our staff and are ready for you to type in and run. And, the BASIC Training Challenge (see page 55) gives you ideas and hints for writing your own programs—and offers prizes for the best original ones. So get down to BASIC's—and have fun doing it.

—Richard Chevat, Technical Editor

THE RIGHT STUFF: ATARI

Do you have the "right stuff" to be a space jockey? This A-OK game program for Atari computers, written by computer programmer Jim Clark, lets you find out.

ALL PHOTOS© DEBORAH FEINGOLD

In the game, you use a joystick to dock your spaceship. Watch out for the "solar wind" which will drive you off course. If you want to make the game more difficult, see if you can add some obstacles to the screen.

NOTE: When you see the symbol (‡) in the program, you should first press the ESC key, then hold down the CTRL key and type the number 2. When you see the symbol (§) press the ESC key, then hold down SHIFT and press CLEAR.

```
10  GRAPHICS 1:POSITION 1,1
20  ?#6;"----dock<>here----"
30  POSITION 1,2
40  ?#6;"//////// \\\\\\\\"
50  POKE 559,62:HP=120
60  POKE 704,116
70  PM=PEEK(106)-8
80  POKE 54279,PM
90  POKE 53277,3
100 P=PM*256+1024
110 FOR I=0 TO 255
120 POKE P+I,0
130 NEXT I:SP=178:GOSUB 800
140 ?"COUNTDOWN"
150 SOUND 1,20,0,4
160 FOR I=10 TO 0STEP -1
170 POSITION 17,0
180 ?#6;I;" ":?"‡‡";
190 NEXT I
```

```
200 ?"LIFTOFF ‡"
210 SETCOLOR 2,5,5
220 FOR SP=176 TO 38 STEP -2
230 SOUND 0,SP,10,4
240 IF SP>75 AND RND(-1)<.4
    THEN HP=HP+
    INT(RND(-1)*5-2.5):
    ?"§ SOLAR WIND‡"
250 SOUND 0,HP,10,4
260 GOSUB 700:GOSUB 800
270 GOSUB 900:NEXT SP
280 ?"YOU HAVE THE RIGHT
    STUFF"
290 SOUND 1,0,0,0
300 FOR I=255 TO 0 STEP -1
310 SOUND 0,I,10,5
```

(Program continues on next page)

(Continued from page 51)

```
320 NEXT I:END
700 D=STICK(0)
710 IF D=11 THEN HP=HP-1
720 IF D=7 THEN HP=HP+1
730 RETURN
800 RESTORE: POKE 53248,HP
810 FOR I=SP+P TO SP+P+15
820 READ A:POKE I,A
830 NEXT I
840 POKE 53278,0:RETURN
900 H=PEEK(53252)
910 IF H=0 THEN RETURN
920 ?"SORRY, BUT YOU
    LOST":END
999 DATA 24,60,36,126,110,118,
    255,195,255,255,255,165,165,
    165,0,0,0,0,0
```

—*Jim Clark*

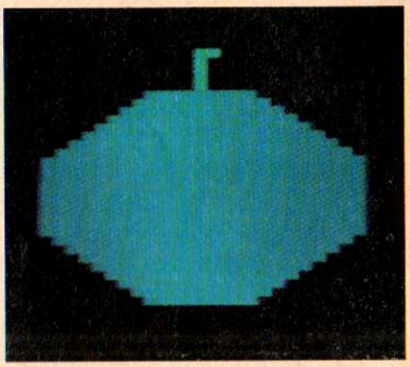
FLASHING APPLE

We are proud to present the first BASIC Training program created for us by our readers. It draws an apple on your Apple—one that changes colors at a speed you choose.

This program was written by two sisters, Joell and Janea Reiter from West Palm Beach, Florida. Joell is 13 and Janea is 10. As thanks for letting us print their work, we are sending them two ENTER T-shirts. (For more info on sending us your programs, see BASIC Training Challenge #2.)

If you want this program to last longer, change the number on line 235 from 25 to a higher number.

```
10  HOME
20  PRINT "INPUT SPEED—
    FROM 1 TO 1000"
30  INPUT S
35  A = 0
40  A = A + 1
45  HOME
50  GR
60  COLOR = INT (16 * RND (1))
70  HLIN 8,32 at 20: HLIN 8,32
    AT 21: HLIN 8,32 AT 19
80  HLIN 8,32 AT 17: HLIN 8,32
    at 23
90  HLIN 8,32 AT 18: HLIN 8,32
    AT 22
```



```
100 HLIN 8,32 AT 16: HLIN 8,32
    AT 24
110 HLIN 9,31 AT 15: HLIN 9,31
    AT 25
120 HLIN 10,30 at 14: HLIN
    10,30 AT 26
130 HLIN 11,29 at 13: HLIN 11,29
    at 27
140 HLIN 12,28 at 12: HLIN 12,28
    at 28
150 HLIN 13,27 at 11: HLIN 13,27
    at 29
160 HLIN 14,26 at 10: HLIN 14,26
    at 30
170 HLIN 15,25 AT 9: HLIN 15,25
    AT 31
180 HLIN 16,24 AT 8: HLIN 16,24
    AT 32
190 COLOR = INT (16 * RND (1))
200 VLIN 3,7 at 20
210 PLOT 21,3
220 FOR D = 1 to S
230 NEXT D
235 IF A > 25 THEN END
240 GOTO 40
```

SHIP-SHAPE: TRS-80

When it comes to scrolling, your computer has a one-track mind. Characters generally move only in one direction—straight up. Here's a program that makes your TRS-80 Model I, III or 4 scroll right and left —*and* two directions at once!

This program was written for ENTER by David Lewis, an 18-year-old freshman at Union College in Schenectady, New York. It lets you play a short game in which you guide a ship down the screen while objects are flying up at you. To avoid objects, press the left and right arrow keys. Your ship won't move—the *entire* screen will.

```
10  DEFINT A-Z: DEFSNG S :
    REM ARRAY MUST BE
    INTEGER
20  DIM A (21)
30  FOR J= 0 TO 21
40  READ A(J)
50  S = S+A(J)
60  NEXT
70  IF S<>152977 THEN
    PRINT "I THINK YOU
    MADE A MISTAKE.":END
80  F$=CHR$(153)+
```

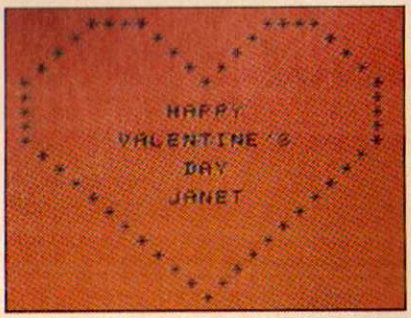
(Program continues on next page)

```
    CHR$(179)+CHR$
    (166):REM OBJECTS
90  G$=CHR$(173)+CHR$
    (191)+CHR$(158) : REM
    SHIP
100 D = 20: REM CHANGE
    THIS NUMBER TO
    CHANGE SPEED
110 F = 0:H = 0
120 V = VARPTR (A(0))
130 MS = V/256:LS =
    V-MS*256
140 IF PEEK(16396) =201
    THEN POKE 16526,LS:
    POKE 16527,MS ELSE
    DEFUSR = V
150 CLS
160 FOR J = 1 TO D : NEXT
170 PRINT@32,"    ";
180 IF PEEK(14400) AND 32
    THEN FOR F = 1 TO 3: J
    = USR(1): NEXT ELSE IF
    PEEK(14400) AND 64
    THEN FOR F = 1 TO 3:
    'J=USR(0): NEXT
210 IF PEEK (15457) <>32
    THEN 300: REM CRASH
    ROUTINE
220 H=H+1
230 PRINT@959+
    RND(61),F$
240 PRINT@32,G$;
250 GOTO 160
300 PRINT@448, "CRASH!"
    H-14 "SHIPS PASSED!"
310 INPUT "PRESS ENTER TO
    CONTINUE";F$
320 RUN
1500 DATA 32717,32010,
    16055, 10256, 8465,
    16382,-239, 319
1510 DATA 63,-18195,
    6955,8253,-13834,
    289,4412,15360, 16129
1520 DATA -4864,9136,
    15635,-2528,201
```

—*David Lewis*

VIDEO VALENTINE: T. I.

Tired of those same old Valentine's Day cards? Here is a program for the T/I 99/4 or 99/4A that will bring your message into the computer age. Run the program, enter your valentine's name, and watch what happens. To make your valentine even more interesting, can you get the computer to draw the heart in red while leaving the background some other color? Can you get the heart to beat? Try your own variations.



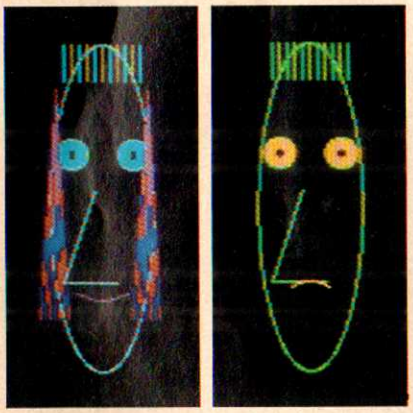

```
5   CALL CLEAR
15  DIM R(30)
20  DIM C(30)
25  GOSUB 1000
50  PRINT "WHO IS THIS
    VALENTINE FOR?"
52  PRINT
55  PRINT "ENTER A NAME
    WITH"
60  PRINT "FEWER THAN 12
    LETTERS"
65  INPUT NA$
70  LN=LEN(NA$)
75  IF LN>11 THEN 55
80  HP=INT((11-LN) /2)
85  IF LN<1 THEN 87 ELSE
    90
87  HP=1
90  CALL CLEAR
95  CALL SCREEN(7)
100 REM PRINT VALENTINE
130 PRINT TAB(12)
    ;"HAPPY"
132 PRINT
135 PRINT TAB(9)
    ;"VALENTINE'S"
137 PRINT
140 PRINT TAB(13): "DAY"
142 PRINT
150 PRINT TAB(9+HP);NA$
160 FOR J=1 TO 8
165 PRINT
170 NEXT J
200 REM MAKE HEART
210 RR=7
212 CR=16
214 RL=7
216 CL=16
220 FOR I=1 TO 27
230 RR=RR+R(I)
235 CR=CR+C(I)
240 RL=RL+R(I)
245 CL=CL-C(I)
250 CALL HCHAR
    (RR,CR,42,1)
260 CALL HCHAR
    (RL,CL,42,1)
270 NEXT I
300 PRINT TAB(5);"PRESS
    SPACE BAR TO END."
330 CALL KEY(O,K,P)
340 IF K=32 THEN 999 ELSE
    330
999 END
1000 FOR I=1 TO 27
1010 READ R(I)
1020 READ C(I)
1030 NEXT I
1040 RETURN
10000 DATA 0,0,-1,1,-1,1,-1,
    1,-1,1,0,1,0,1,0,1,1,1
10010 DATA 1,1,1,1,1,1,0,1,0,1,
    0,1,0,1,-1,1,-1
10020 DATA 1,-1,1,-1,1,-1,
    1,-1,1,-1,1,-1,1,-1,
    1,-1,1,-1
```

—*Jeff Nilson*

(Basic Training continues on next page)

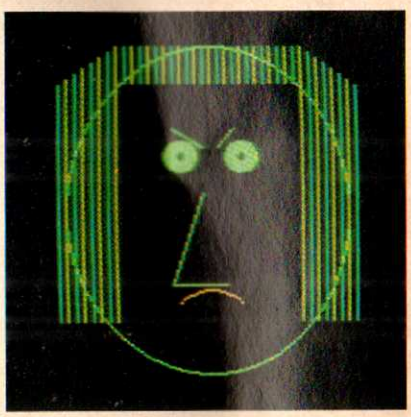
SELF-PORTRAIT: IBM-PC

This is a program for the IBM-PC with a color graphics card. It was written by 16-year-old Bela Selendy, a member of ENTER's advisory board. You type in the program and answer its five questions, then sit back and watch as the computer draws its impression of you. To run the program again, press CTRL, then BREAK.



If you own a computer other than the IBM-PC, you might try to write a version of this program for your own machine. It's easier than you think. Don't copy this program line-by-line—just use its structure (logic) as a guide. And remember that you must change all the special IBM graphic commands —like CIRCLE, PAINT and LINE— to commands that will work on your computer.

```
10  CLEAR
20  KEY OFF:SCREEN
    1:COLOR 8,5:CLS:LOCATE
    4,10
30  PRINT "SELF PORTRAIT"
40  PRINT :INPUT "What is
    your name (CAPITAL
    LETTERS ONLY PLEASE)
    ";N$
50  PRINT :INPUT "Is your hair
    long or short? (L or S)";HA$
60  PRINT :INPUT "What color
    are your eyes (B)LUE,
    (BR)OWN OR (H)AZEL?";E$
70  PRINT :INPUT "Are you fat
    or thin?";W$
80  PRINT :INPUT "Is your nose
    big or small?";NO$
90  PRINT :INPUT "Are you
    happy, sad or angry?";H$
100 IF W$="FAT" OR
    W$="fat" THEN A = 1
110 IF W$="THIN" OR
    W$="thin" THEN A=8/3
120 COLOR 0,0
130 CLS:CIRCLE (160,100),
    90,,,,A
140 IF E$="H" THEN CC=3
150 IF E$="B" THEN COLOR
    0,1
160 IF E$="BR" THEN CC=2
170 IF E$="B" THEN CC=1
180 CIRCLE (140,70),10:CIRCLE
    (180,70),10
190 PAINT (140,70),CC,3:PAINT
    (180,70),CC,3
200 CIRCLE (140,70),
    2,0:CIRCLE (180,70),2,0
210 PAINT (140,70),0,0:PAINT
    (180,70),0,0
220 IF NO$="BIG" OR
    NO$="big" THEN 250
230 LINE (160,100)-(145,130)
    :LINE (145,130)-(165,130)
240 GOTO 260
250 LINE (155,90)-(135,140)
    :LINE (135,140)-(170,140)
260 IF W$="THIN" THEN 310
270 FOR SH=100 TO 220
    STEP 5
280 LINE (SH,5)-(SH,30)
290 NEXT SH
300 GOTO 340
310 FOR SH=145 TO 175 STEP 5
320 LINE (SH,5)-(SH,25)
330 NEXT SH
340 IF HA$="S" THEN 490
350 IF W$="THIN" THEN 450
360 Y=10
370 X=31
380 FOR LH=65 TO 100 STEP 5
390 LINE (LH,X)-(LH,180)
400 LINE (LH+155,Y)
    -(LH+155,180)
410 Y=Y+3
420 X=X-3
430 NEXT LH
440 GOTO 490
450 FOR LH=120 TO 140
    STEP 3
460 LINE (130,35)-(LH,180),2
470 LINE (190,35)-
    (LH+60,180),2
480 NEXT LH
```



```
490 REM        EMOTIONS
500 PI=3.141593
510 IF M$="HAPPY" THEN 540
520 IF M$="SAD" THEN 560
530 IF M$="ANGRY" THEN
    580
540 CIRCLE (160,125),30,2,
    1.3*PI,1.7*PI
550 GOTO 600
560 CIRCLE (160,170),
    30,2,.7*PI/2,1.3*PI/2
570 GOTO 600
580 CIRCLE (160,168),
    30,2,.5*PI/2,1.5*PI/2
590 LINE (155,65)-(135,55)
    :LINE (165,65)-(175,55)
600 LOCATE 10,1:PRINT
    N$:GOTO 600
610 END
```

—*Bela Selendy*

SOLUTION TO CHALLENGE #1: TRS-80, COMMODORE

ENTER Challenge #1 asked you to create a program in which you guess a number that your computer has chosen. Below, we've printed one possible solution, written for the TRS-80 models III and 4 and Commodore machines.

Your solution probably doesn't look exactly like ours. But as long as your answer does everything the Challenge asked for, your program was a success.

To understand how our solution (printed below) works, think of it as having two parts. The first part—lines 10 through 140—is where the computer picks the number between variables L(low) and H(high)—in this case, one and 100.

The actual calculation of the number takes place on line 110. "RND" is a BASIC command that gives you a random number (actually, it's a decimal fraction, like .50). Most versions of BASIC have this feature, but it works a little differently on each machine. "INT" is a BASIC command for TRS-80 and Commodore that rounds off a number. In line 110, it rounds off the answer to the next lowest whole number.

The second part of our program (lines 150-280) is a loop that allows the computer to judge your guesses, and to give you hints of "higher" or "lower." The IF statements in lines 200 and 210 compare your guess with the number the computer has picked, and then decide which path the program will take.

NOTE: To run this program on Commodore machines, you must make two simple changes. First, delete line 20. Then enter a new line 110 that reads:

```
110 N = INT (RND(TI) *
    (H - L + 1)) + L
```

OUR SOLUTION

```
10  REM GUESS
20  RANDOMIZE
30  REM RANGE H TO L
40  L = 1
50  H = 100
60  REM NG = NUMBER OF
    GUESSES
70  FOR NG = 1 TO 50
80  IF 2^NG > = H - L THEN
    100
90  NEXT NG
100 REM N IS THE NUMBER
110 N = INT (RND *
    (H - L + 1)) + L
120 PRINT "I AM THINKING OF
    A NUMBER BETWEEN";
    L; "AND"; H
130 PRINT "YOU SHOULD
    GUESS IT IN"; NG; "TRIES
    OR LESS"
140 PRINT
150 REM T COUNTS TRIES
160 T = 0
170 T = T + 1
180 PRINT "WHAT IS YOUR
    GUESS?"
190 INPUT G
200 IF G = N THEN 240
210 IF G < N THEN PRINT T;
    " - HIGHER": GOTO 170
220 PRINT T; " - LOWER"
230 GOTO 170
240 PRINT
250 PRINT "GOT IT-IN"; T;
    "TRIES"
260 END
```

—Paul Nadler

CHALLENGE #2: GREETINGS!

This month's challenge has one requirement—that you use your imagination and programming skills to create a video birthday card. You can use any combination of graphics, color and sound. You can program animation into your birthday message, or a riddle, or get your computer to play the tune of "Happy Birthday." You can even dream up something unique, as long as your program makes the viewer smile.

We'll pick our favorite program, print it in a future issue, and send the author an ENTER T-shirt. We'll be looking for solutions that are creative and fun to use. This month's Valentine's Day card is an example of the kind of program we have in mind. But don't be afraid to branch out on your own. Just remember that our space is limited, so keep your answer under 50 statements.

Send your program to BASIC Training Challenge #2, CTW, 1 Lincoln Plaza, New York,, NY 10023. Programs can be for any home computer, but they must be accompanied by a short letter that describes what the program does and tells us your name, age and T-shirt size.

CORRECTION

The program "The Commodore's Flag" in issue #3 contained an error in line 90. The line should have read:

```
90  FOR L = 0 TO 39: POKE
    C + L,2: POKE S + L,160:
    NEXT L: REM PAINT
    LAST STRIPE
```

THE SEARCH FOR LIFE IN SPACE

Karl Lind is hoping to find more than stars up in the sky.

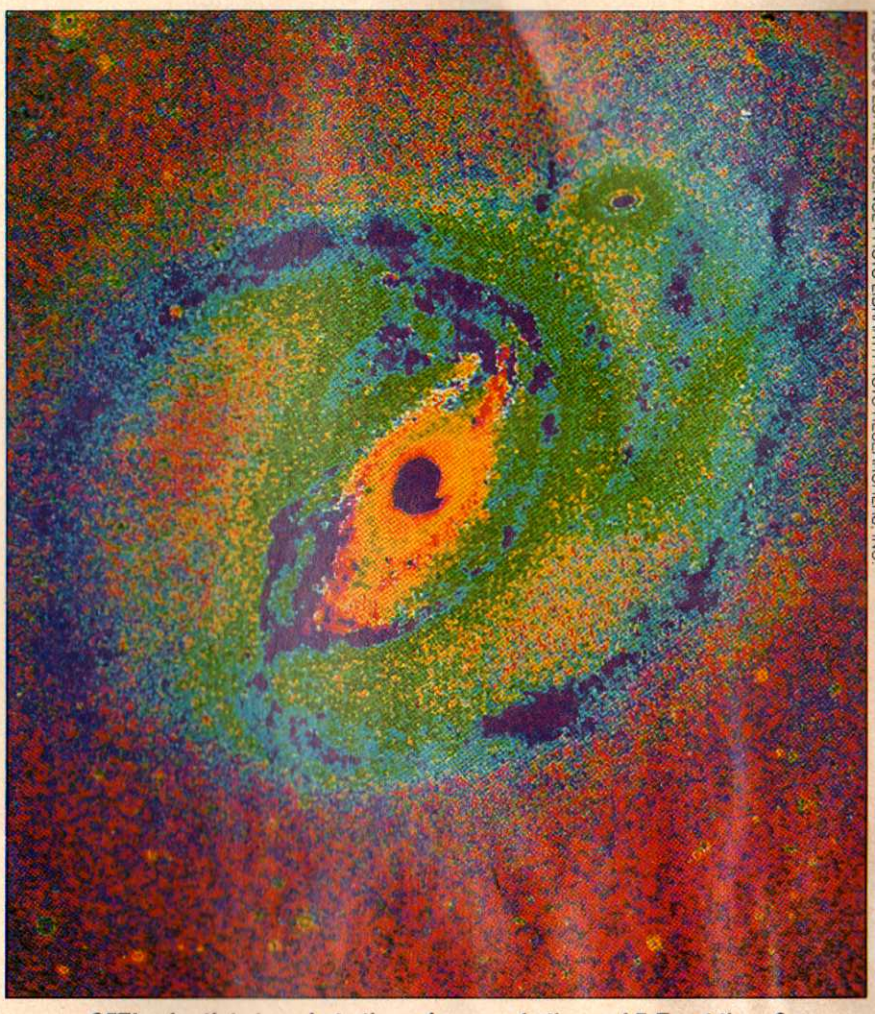
Outside his California home, Lind is using his Atari home computer and a special analyzing device to listen for signals from outer space. His set-up is relatively simple, but he's hoping he'll find something "out there" that will prove there is intelligent life in space.

And he is not alone.

The National Aeronautics and Space Administration (NASA), Harvard University, and countries like Canada, Japan and the Soviet Union are all involved in the Search for ExtraTerrestrial Intelligence—or SETI, as it is called.

"The 'professionals' are looking at a lot of stars, so their odds are better than mine," admits Lind, who works during the day as an engineer. "But I'm gambling that the star I picked *(Sigma Draconis)* will have life. If it does, I'll have sensitive enough equipment to find it. I'm doing the same thing as the big boys. My system puts me in the ballpark."

Karl Lind's SETI equipment is much less powerful than systems being used by professionals at NASA and Harvard. But all of these systems operate in much the same way.



PHOTO© J. LORRE, SCIENCE PHOTO LIBRARY/PHOTO RESEARCHERS, INC.

SETI scientists tune in to the universe...Is the real E.T. out there?

Radio telescopes look a lot like satellite receiving dishes (see ENTER, "State of the Art," Feb.1984), but they pick up signals from far greater distances. Each radio telescope is pointed at a star system. SETI researchers use their radio telescopes to *tune in* to a specific sound frequency. They do this in a way similar to the way you tune in to a favorite radio station. But these researchers aren't listening for hit music; they're trying to detect signals that *might* have been sent by life that *might* exist in that star system.

Any soundwaves picked up by the radio telescopes are broken down into about 100,000 separate signals by a special device called a multichannel spectrum analyzer (MCSA). These signals are then analyzed by a group of computers. Using complex mathematical formulas, the computers can calculate whether the signals originate here on Earth or in outer space.

Like other SETI researchers, Paul Horowitz of Harvard University believes that a signal coming from alien life in space will be stable and confined to one frequency.

"We are assuming that the extraterrestrials won't be nasty by transmitting erratically, or bopping signals around from channel to channel," Horowitz says.

Ears Around the World

Harvard's 85-foot radio telescope is located in a parking lot on the university's Cambridge, MA, campus. The Harvard SETI project, which began in March 1983, is focusing on a half dozen sound frequencies. It will take about five years to complete.

The NASA SETI project does not fully begin until 1988, but will be more comprehensive than other SETI efforts. "It's as if the Harvard SETI can play one key on the piano, while we can play all 88," explains Michael Klein of NASA.

The NASA effort will have six spectrum analyzers hooked up to six radio telescopes located around the world—including the world's largest and most sensitive radio telescope in Arecibo, Puerto Rico. "We'll be able to hear a lot more signals and a lot weaker signals," says Klein.

NASA, in trying to be as thorough as possible, will divide its SETI into two parts: a targeted search and a sky survey.

In the targeted search, some of the radio telescopes will be directed at one star at a time, and will include 773 specific stars. In the survey, radio telescopes will focus each day on a different slice of the sky.

"The targeted search is designed to look at the places from which we are most likely to get a signal," says John Billingham, director of the NASA project. "But we don't want to miss anything, so we're doing a sky survey, too."

In a further effort to be thorough, NASA will do spot checks on various sound frequencies in hope of finding extraterrestrials sending brief and erratic signals. "Right now, a signal has to last at least a second for the equipment to detect it," explains Billingham. "What if the signals are being pulsed, like a signal from a lighthouse? We want to be able to find signals that last anywhere from a millisecond to those that are continuous."

A Long Wait

People have always been curious about extraterrestrials. But it is only recently that we have developed the technology needed to conduct a wide-scale search for life in other parts of the universe.

"We do in one minute what it would have taken the first SETI system 100,000 years to do," says Harvard's Paul Horowitz.

Yet even with the best equipment, this search could take centuries. SETI researchers, however, are convinced, they will eventually, find the real E.T.

"There are trillions of stars out there like the sun," says NASA's John Billingham. When you have planets like our Earth going around stars like our sun, odds are that life will be—not *may* be—out there somewhere.

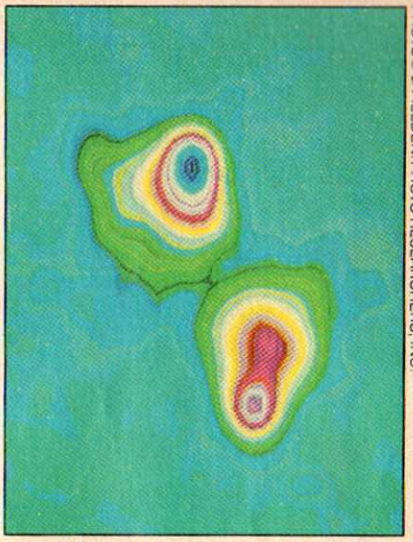


PHOTO © J. FIELDEN/PHOTO RESEARCHERS, INC.

Distant images: a galaxy...

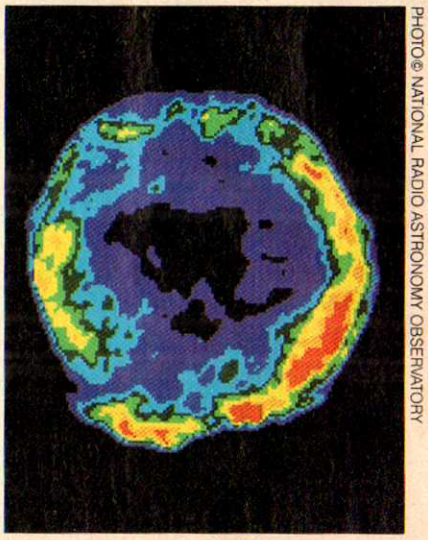


PHOTO © NATIONAL RADIO ASTRONOMY OBSERVATORY

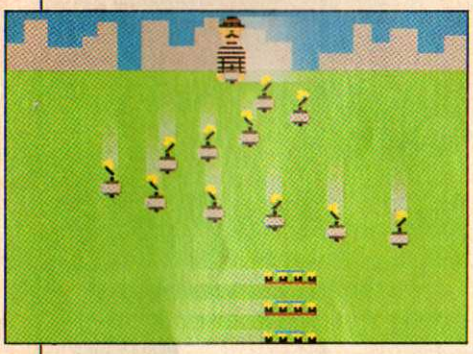
...and an exploding star...

PHOTO © BILL & JAN MOELLER/THE IMAGE BANK

...detected by radio telescopes.

(Continued from page 16)

game in which one player takes the part of the bomber. When you try to catch bombs being controlled by a human, you'll



remember fondly how "easy" it was playing against the computer.

WRAP-UP

BERNIE: I like *Kaboom!* You get bombed, and you die, but you don't take it personally.

PHIL: I've always loved *Kaboom!*, but playing the bomber for a change is a real treat.

DEMON ATTACK

(Imagic, VIC-20, $40. Also available for VCS, Intellivision, Odyssey², Atari 400/800/1200 and Texas Instruments 99/4A computers)

"The gameplay, graphics and sounds are nearly identical on all six systems."—Phil
"But the VIC-20 version may be best of all."—Bernie

Demon Attack features beautifully animated alien birds that sweep back and forth. You dodge by sliding your cannon right and left. Graphics and sounds on the computer version are fine, but they're no improvement over the original VCS game.

In each wave, you must eliminate eight large birds. Only three are on screen at a time, with the others waiting in the wings to replace them. Here the VIC-20 version makes a significant design improvement: if the last bird in a wave is not on the bottom level, it immediately will descend and begin bombing.

The wonderful action in *Demon Attack* comes after the fifth wave, when a bird that's been hit splits into a pair of smaller birds. And each pair acts as true mates should—when one dies, the other makes a kamikaze dive for your cannon.

WRAP-UP

BERNIE: I don't know what I'm killing in this game—certainly not little birdies. I feel more like I'm at a very nicely designed target gallery.

PHIL: It's one of the best action challenges for the computer, but I think it's time we got out of the "toy gun" games.

SPACE PANIC

(Coleco, ColecoVision, $30)

"Enough strategic depth to become a classic."—Bernie
"The game style is very familiar, but it's different in play."—Phil

Space Panic's arrangement of ladders and walkways reminds one of other ladder-climbing games, but it is an original. Your object is to trap all the space monsters in holes, then fill in the holes and let the monsters fall to their destruction. Violent, yes. But, you can't shoot anything and you can't attack. You have to become a trapper, often using your own character as bait!

The space monsters will take one life if they touch your character, who cannot jump over them. You must be clever. One button allows you to dig a hole in a walkway, but you can't dig unless you are positioned exactly right. When a monster falls in a hole, the second action button fills the hole in. And you can also jump to safety through one of your own holes.

Each maze contains a different arrangement of ladders and walkways, and both the number and type of monsters increase. Some can only be eliminated by falling two and even three levels, which means digging holes that line up vertically and then tempting a monster into the top one. This is no simple feat, but that's the beauty of *Space Panic*: the more difficult it becomes, the more there is to learn.

WRAP-UP

PHIL: This game contains some of the most beautiful music and sound effects I've heard on a game system.

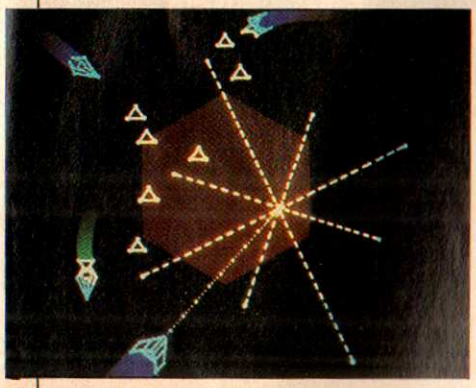
BERNIE: I liked the arcade game, and I like this adaptation. The idea of digging holes and filling them in is very interesting. On the other hand, you have to bury your enemies alive!

RIP-OFF

(GCE, Vectrex, $30)

"Good title: these aliens really leave you feeling ripped off!"—Phil
"This is an excellent arcade game, the type for which Vectrex was designed."—Bernie

You always feel vulnerable playing *Rip-Off* because the alien ships are so fast. They appear suddenly from an edge of the



screen, and attack your position. And they're tricky too, swirling in elusive patterns. You'll feel much more comfortable in the two-player version, where you and another player work together against the aliens. This game is a good incentive to purchase a second controller.

Your ship is very maneuverable, moving much like the ship in *Asteroids*. There are 16 game variations, but without doubt, the best is for two players. This is one of the most cooperative two-player video challenges ever created. You feel like two swordsmen walking back to back.

WRAP-UP

PHIL: *Rip-Off* tests reaction time and hand/eye coordination to the maximum. But the only change from wave to wave is the speed of the ships.

BERNIE: It's one of the most enjoyable, cooperative games currently available for any game system.

QUICK STEP

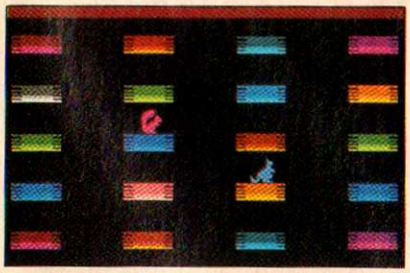
(Imagic, VCS, $19.95)

"I don't like playing against the machine, but the two-player version really gets me hopping!"—Phil
*"A little bit like 'Q*Bert' but a different, original design."*—Bernie

There are not many good two-player VCS games, but *Quick Step* fits that category. You are a kangaroo playing against a squirrel. Both have identical hopping powers. Four columns of platforms scroll down screen; you must turn them your color by hopping on them.

You get three points for being first to touch any platform, but an opponent can turn it back to his color and get six points if the platform then passes offscreen. You never know whether to play near the top or the bottom of the screen.

There's one other nice feature: certain platforms give you the temporary power to render your opponent motionless.



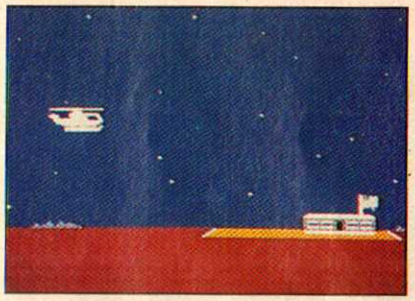
WRAP-UP

PHIL: I liked the audio clues that tell you when a ladder, or single column of platforms, is approaching to take you to the next wave.
BERNIE: This isn't a violent game, but when somebody forces your kangaroo off the screen, you do feel like punching him.

CHOPLIFTER

(Creative Software, VIC-20 cartridge, $29.95). Also available on Apple II, Atari and Commodore 64 (Broderbund Software)

"Probably the most merciful wargame of all time."—Bernie
"Choplifter really makes you feel like one of the good guys!"—Phil



Playing *Choplifter*, you truly feel like you are piloting a rescue helicopter. The object of the game is to search for people who need to be rescued. These tiny figures run helplessly back and forth, waving their little arms when you come close. *You* are their only hope of being saved from patrolling tanks and jets.

Choplifter is not an "offensive" game; you get *no* points for destroying enemy tanks or jets. You take those actions only to defend your people. You win points for the people you pick up and safely deposit back at your base. You must devise a strategy to land the copter— close to (but not on top of!) your people.

WRAP-UP

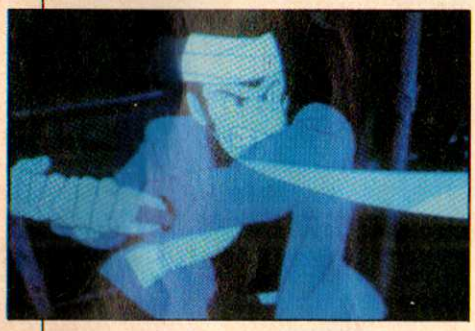
BERNIE: You feel like you're flying a helicopter—something very different from most games. And you can really maneuver it.
PHIL: I play this game best by avoiding contact with the enemy at all costs. That's how I believe I would react in real life!

game plan

By Phil Wiswell

Imagine an arcade game design so simple that there's only one pattern of play that will let you win.

Ridiculous? No, that's the design—and the major flaw—of Stern's animated laser disc game *Cliff Hanger*. Like Cinematronics' *Space Ace* and *Dragon's Lair, Cliff Hanger* offers colorful laser disc animation that is a huge improvement over blocky computer graphics. However, also like those other disc games, it gives players a very limited amount of control. You'll make more decisions in 10 seconds of *Pac Man* than in 10 minutes of playing *Cliff Hanger*.



Cliff Hanger plays hard...

Cliff Hanger is based on a popular Japanese cartoon, and its storyline is slapstick and funny. Cliff and a friend have robbed a casino and begun their getaway before they realize that the money is counterfeit. They spot Princess Clarissa being chased by Count Dreyco and his band of thugs. Cliff decides to turn from thief to hero and try to save Clarissa.

Your challenge in *Cliff Hanger* is to anticipate the type of action Cliff should take at each of 200 different decision points, and effect it with the joystick or buttons. You are prompted to make a response in each case by the appearance, at the bottom of the screen, of a word—either ACTION (hit a button) or STICK (move the joystick).

Searching Safari

Playing *Cliff Hanger* is a lot like participating in an African safari—it's great with a guide, but swift and certain death without one. At the arcade, *Cliff Hanger* players divide into "haves" and "have nots." The "haves" know the pattern and timing of moves. The "have nots" are those who try the game once or twice but don't learn the pattern, and decide not to play again.

To give you a headstart on the "haves" and let you play *Cliff Hanger* for a while before deciding whether to continue, we'll give you the game's first dozen moves: FEET-FEET-HANDS-LEFT-RIGHT-DOWN-LEFT-RIGHT-HANDS-DOWN-HANDS-LEFT.

Memorize that pattern and you'll get some fun for your 50-cent investment. From then on, you're on your own.

Even alone, you can make it pretty far through *Cliff Hanger* by remembering these rules:

- *Always take action*—When the game prompts you to make a move, do something. It's better to guess wrong than to just stand idly by.
- *Know the controls*—There is a joystick and there are action buttons labelled "hands" and "feet." Rest one finger on each button and don't confuse them. And when you're using the joystick, think about the direction you want Cliff to travel.
- *Listen Carefully*—If you can hear over the noise of other games, listen to what Cliff and other characters are saying. Their dialogue can cue you on when it's time to take action.
- *Learn from mistakes*—When you make a mistake and lose a life, pay attention to the screen. It will say something like "you should have gone right." That's good to know for next time you play.

PHOTOS© LINDA SCHWARTZ

...But can he stop the Count?

Final Play Notes

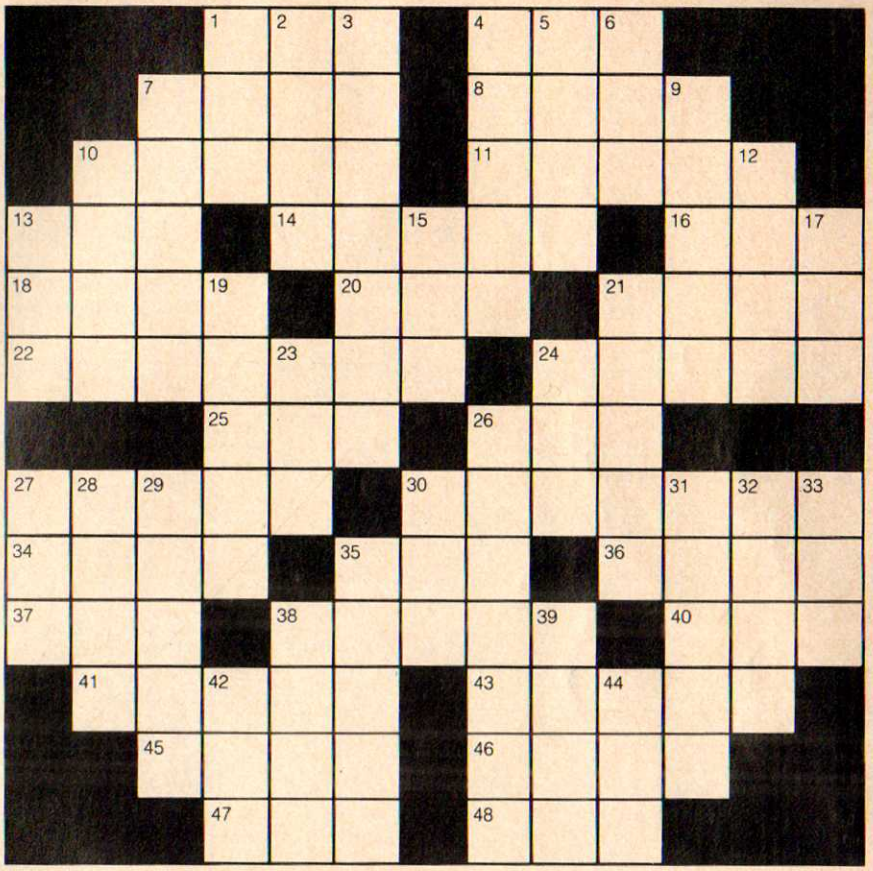
Like other laser disc games, *Cliff Hanger*'s rich animation will attract arcade players. But it is a limited game experience, and after a while people will tire of it. If laser games are to be more than a passing fad, their gameplay will have to become more interesting and varied.

PHIL WISWELL is a contributing editor to ENTER.

VIDEO CROSSWORD

BY LOIS CANTWELL

This crossword puzzle includes clues that will test your video game and computer savvy. Fill in the grid by ENTER-ing your answers in the appropriate spaces.



DOWN

1. Where you dream of video games.
2. If your boat fills with water, do this.
3. Frogger did this at end of game.
4. It's an ____ to be computer literate.
5. No computer is named after *this* fruit.
6. Sea creature, sometimes electric.
7. Narrows; the river in *River Raid* does it.
9. What you wear if you sprain your wrist playing video games.
10. A prince in India: Maha ____.
12. The Jedi master.
13. Computer memory, *NOT* Read-Only.
15. Commodore chip: Sound Interface Device (abb.).
17. Operate a computer.
19. You ____ to become a computer operator.
21. How we'll get a president in 1984.
23. Abbreviation for Incorporated.
24. Much ____ about nothing.
26. Places to play video games.
27. What you knock out in *Breakout*.
28. If you play too many games of *Berzerk*, you could run ____.
29. Large trucks.
30. 11 across blasts from launch ____.
31. If you make one in a video game, you lose a life.
32. Where Popeye's ship sails in the 3rd screen of the *Popeye* game.
33. A Time Pilot flies here.
35. To score a field goal in football, kick through the goal ____.
38. Where you might sit to play a home video game.
39. Stitches.
42. Frogger's seat.
44. Member of NY baseball team.

ACROSS

1. British Broadcasting Co. (Abb.)
4. Donkey Kong is an ____.
7. Game players who are out of quarters shed these.
8. Watches.
10. What E.T. built to call home.
11. Ms. Ride, Astronaut
13. Hit sharply.
14. It lit up Luke's light saber.
16. If you spend too much at an arcade, you might sign one.
18. What 48 across is (two words).
20. With one of these, you could build a robot at home.
21. If your plane is destroyed three times in *Zaxxon*, the game ____.
22. In Act 3, Mr. Pac and Ms. Pac get ____.
24. Seaweed song: "What's It All About, ____?"
25. Plus; in addition to.
26. What lemons make.
27. Language: Beginning All-Purpose Symbolic Instruction Code.
30. What computers do with words.
34. A last word.
35. Yellow dot chomper: ____ Man.
36. Captain Kirk's Star voyage.
37. Video game cartridge memory.
38. Colas and root beers.
40. Beam of light.
41. Metric weight, equals 2.2
43. Computers you use in store.
45. Kind of "wares."
46. A type of water jug.
47. *Pole Position* fuel.
48. The Concorde is one of these.

(Answers on page 64)

INPUT

THE ENTER POLL

We'd like to know about your experience with computers, and what you think of some of the articles in this month's ENTER. Your answers help us plan future issues, so please be honest. We'll send ENTER t-shirts to 50 of you, picked at random.

Mail your questionnaire by March 15 to: ***INPUT #3, ENTER Magazine, P.O. Box 777, Ridgedale, N.J. 07657***

I. Tell us about yourself:

Name _____

Address _____

City _____ State & Zip _____

Grade ___ Age ___ Male ___ Female ___

T-shirt size Kids L ___ Adult S ___ M ___ L ___

Where did you get this issue of ENTER?

___ In the mail ___ At a computer store ___ At a book-store or newsstand ___ Other (explain) _____

II. We'd like to know about you and computers:

A. Does your family own a computer? ___ Yes ___ No
Which kind? _____

B. What peripherals does your family own? (Check all that apply.) ___ Disk Drive ___ Joysticks ___ Printer ___ Cassette Drive ___ Modem ___ Other

C. Do you participate in any networks, like The Source, CompuServe or local "bulletin boards"? ___ Yes ___ No If yes, explain _____

D. Do you write your own programs? ___ Yes ___ No
What computer language do you use? _____

E. Did you try any of the programs in this month's Basic Training? ___ Yes ___ No Which One? _____
Did you get it to work? ___ Yes ___ No
Would you like ___ longer or ___ shorter programs in Basic Training?

F. Do you own either of the following: ___ Video Cassette recorder ___ Video Disk Player

III. Tell us what you think about this issue's articles.

A. Did you read the story on COMPUTER BREAK-INS? ___ Yes ___ No. What did you think of it? ___ Liked it ___ OK ___ Didn't like it

1. Should Paul and the other 414s be charged with a crime? ___ Yes ___ No ___ Don't Know

2. Do you know anyone who has gained access to a main frame illegally, using a home computer and a modem? ___ Yes ___ No

B. Did you read the story on COMPUTER CAMPS? ___ Yes ___ No What did you think of it? ___ Liked it ___ OK ___ Didn't like it

1. Have you ever attended a computer camp? ___ Yes ___ No

2. Are you thinking of attending computer camp this summer? ___ Yes ___ No

C. Did you read RANDOM ACCESS? ___ Yes ___ No
What did you think? ___ Liked it ___ OK ___ Didn't like it

1. If you have a computer at home, who uses it most? ___ You ___ Parents ___ Brother/Sister

2. Who knows more about computers, you or your parents? ___ I do. ___ My parents do.

3. Have you ever tried to teach your parents about the computer? ___ Yes ___ No. What happened? _____
_____
_____

4. Do your parents read your copy of ENTER? ___ Always ___ Sometimes ___ Never

COMPUTER WORD-SEARCH

BY JOHN K. YOUNG

Hidden in the box below are 28 computer-related words. To find the words, you must look up and down, diagonally and even backwards.

We've circled one to get you started. How many micro-seconds will it take you to find the other 27?

ACCESS
CARTRIDGE
CELL
CONSOLE
COPY
DATA
DRIVE
FLOPPY
FORMAT
GENERATION
INTEGRATE
LOOP
MANIPULATE
MEMORY
MICRO
MODIFY
MODULE
PEANUT
PLUG
PRINTER
PROGRAM
PROTOCOL
RUB
SOFTWARE
SPEED
STORE
SYSTEM
TEXT

(Answers on page 64)

G P S T R Q L B T L R L P T G O
R I T B A W P E C H G C B S O R
O R L Y F I D O M U A E E P V S
T M O P O T R S O F T W A R E L
L N O E B C X S P A A F R O I M
Q Z P R I N T E R E D O E T N K
H A T M O O R G T C E T D O N I
I B T U R I E F U E A D N C C J
K T A E N T T L E L O S N O C V
X L M C N A D O U L P R P L M U
C A R I C R E P A D E Y U A E R
N F O C I E I P P R O G R A M S
P G F V J N S Y S T E M B H O P
Y Q E C A E F S E S R U H T R T
R N A M E G D I R T R A C D Y N
E M H M F T I O V E G R D A S Y

next

COMING IN APRIL

STEVIE WONDER: This superstar makes computers do wonderful things on his newest album, "People Move Human Plays." In our in-depth interview, he explains how state-of-the-art equipment has changed his music *and* his life.

SOFTWARE PIRACY: Is it all right to copy computer software—or is it stealing? We look at both sides, and ask your opinion.

THE BIRTH OF ADAM: ENTER's hands-on review of Coleco's new computer system. Is it a breakthrough or a bust? A buyer's guide.

PLUS: Real-life whiz kid Jon Rotenberg; a report on the new computerized TV sets; programming for six machines.

WINNERS!

The following 50 readers were winners of ENTER t-shirts in our INPUT poll #1 drawing.

Annie Doyle, NY; Cheryl Muniz, NY; Nanette Hegwood, ND; Soo Ihm, AL; Marilyn R. Toda, FL; Jenny Lapabota, NY; Justin Howell, IL; Vera Melianovich, ME; Craig Grotjohn, OR; Laura Sudar, CA; Ashish Morzaria, Canada; Roland Yoshida, CA; Steve F. Posto, WI; Kristina McAllister, MA; Melissa Pecullan, NY; Jason Gibson, NY; Eric Wilbur, MA; Alicia Reader, CA; Sean Reichle, CA; Jimmy Joe Hayes, KN; Helen Burgess, NY; Dan Greenberg, NC; Robbie Gaston, IN; Michael Shanahan, AL; Matt Hall, MI; Robin Castro, FL; Dave Deltano, MA; Guy Steinberg, IL; Myron Oleschko, IL; Mitra Kelly, IA; Tonya R. Betts, IL; Michael Wilt, NY; Amy Singer, CT; Christopher DeGracia, PR; Linette Smith, VA; Troy W. Day, KY; James J. Jackson, IL; Alex Bogel, NY; Kay & Karen Wedel, MI; Pauline Fleming, MI; Christopher Collins, FL; Jean Louise Tuttle, FL; Brian Gentry, KS; John Brown, CA; Kristy Simpson, TX; Leigh Boniello, NJ; David Fouche, VA; Philip Swafford, TN; Jay Sheriff, OK; Darren Johnston, FL

answers

COMPUTER CROSSWORD *(page 61)*

■	■	■	B	B	C	■	A	P	E	■	■	■	■
■	■	T	E	A	R	■	S	E	E	S	■	■	■
■	R	A	D	I	O	■	S	A	L	L	Y	■	■
R	A	P	■	L	A	S	E	R	■	I	O	U	■
A	J	E	T	■	K	I	T	■	E	N	D	S	■
M	A	R	R	I	E	D	■	A	L	G	A	E	■
■	■	■	A	N	D	■	A	D	E	■	■	■	■
B	A	S	I	C	■	P	R	O	C	E	S	S	■
A	M	E	N	■	P	A	C	■	T	R	E	K	■
R	O	M	■	S	O	D	A	S	■	R	A	Y	■
■	K	I	L	O	S	■	D	E	M	O	S	■	■
■	■	S	O	F	T	■	E	W	E	R	■	■	■
■	■	■	G	A	S	■	S	S	T	■	■	■	■

WORD HUNT *(page 63)*

G P S T R Q L B T L R L P T G O
R I T B A W P E C H G C B S O R
O R L Y F I D O M U A E E P V S
T M O P O T R S O F T W A R E L
L N O E B C X S P A A F R O I M
Q Z P R I N T E R E D O E T N K
H A T M O O R G T C E T D O N I
I B T U R I E F U E A D N C C J
K T A E N T T L E L O S N O C V
X L M C N A D O U L P R P L M U
C A R I C R E P A D E Y U A E R
N F O C I E I P P R O G R A M S
P G F V J N S Y S T E M B H O P
Y Q E C A E F S E S R U H T R T
R N A M E G D I R T R A C D Y N
E M H M F T I O V E G R D A S Y

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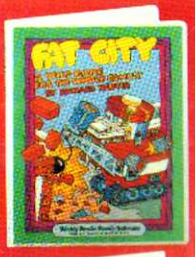

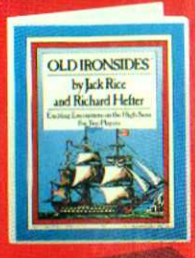

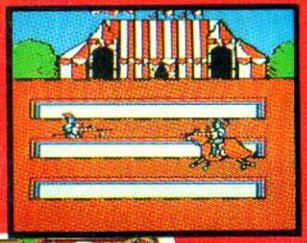

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